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THE
NATURAL HISTORY
OF
OVIPAROUS QUADRUPEDS
AND
SERPENTS.

ARRANGED AND PUBLISHED FROM THE PAPERS
AND COLLECTIONS OF THE

COUNT DE BUFFON,

BY THE

COUNT DE LA CÉPEDE,

KEEPER OF THE ROYAL CABINET, AND MEMBER OF THE
ACADEMIES AND SOCIETIES OF DIJON, LYONS, BOUR-
DEAUX, ROME, STOCKHOLM, &c. &c.

IN FOUR VOLUMES,

ILLUSTRATED WITH COPPERPLATES.

TRANSLATED BY
ROBERT KERR, F.R. & A.S.S. Ed.

VOL. II.

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1802.

THE HISTORY
OF THE

ROYAL SOCIETY OF LONDON

FROM THE YEAR 1660 TO 1703

IN TWO VOLUMES.

THE FIRST PART, CONTAINING
THE HISTORY OF THE SOCIETY, FROM
THE YEAR 1660 TO 1703.

BY JOHN STUART.

LONDON, Printed by J. Sturges, 1712.

THE HISTORY OF THE
ROYAL SOCIETY OF LONDON
FROM THE YEAR 1660 TO 1703.
IN TWO VOLUMES.
THE FIRST PART, CONTAINING
THE HISTORY OF THE SOCIETY,
FROM THE YEAR 1660 TO 1703.

THE SECOND PART, CONTAINING
THE HISTORY OF THE SOCIETY,
FROM THE YEAR 1703 TO 1742.

LINNEAN PREFACE

TO THE

CLASS OF AMPHIBIA *.

*How terrible are thy works, O Lord! In
the multitude of thy wonders, thou shalt
put thy despisers to fear.*

THE animals which compose the Class of Amphibia are mostly naked; and, being cold blooded, are, for the most part, only to be found in summer, as they hybernate during the cold weather. They have all a

VOL. II.

a

simple

* The Translator has thought that the Linnean Preface to the Class of Amphibia, which contains the Amphibious Quadrupeds and Serpents, and forms the subject of this work, might be very acceptable to the readers.

simple circulation of the blood ; having only one auricle and one ventricle. The lungs, at least of the Amphibious Quadrupeds, are under the arbitrary command of the animals, which can breath regularly, or refrain from breathing for a considerable time, as circumstances and situation require. Serpents are distinguished by a double penis, and by remarkably moveable and distensible jaws.

The animals of this class have, for the most part, a cold body, a naked skin, lurid colours, a grim countenance, a jealously watchful eye, a disagreeable odour, a harsh roopy voice, and frequent squalid places. Some are endowed with venom. They are tenacious of life, and have the power of reproducing such parts of their bodies as are cut off. They are produced from eggs.

Nature

Nature has given a kind of double life to a great number of the Amphibious class. Some undergo a metamorphosis, or complete change of shape and appearance. Some cast their skins. Some live indiscriminately in the water and on the land. Some hibernate, or remain in a torpid state for half the year. Some catch their prey by force, others by craft, and some, by fascination, cause it to fall into their mouths.

The skeleton of Amphibious Animals is composed of cartilage instead of bone. The circulation of their blood is slow. They have no diaphragms. Their sight and hearing are acute, but their sense of feeling seems dull. The air cells of their lungs are large; the liver is divided into lobes. They have hepatic, cystic, and pancreatic ducts. The stomach is thick and oblong. They

do not perspire, and are capable of sustaining a very long fast.

The class is divided into two orders, *Reptiles* having feet, and *Serpents* which have no feet.

REPTILES, which have feet, have an external opening or hole, communicating by a canal with the organ of hearing, but no external ears. They are variously constructed, in their external figure, and they live in various manners. *Tortoises* are covered by a horny shell: *Dragons* are provided with wings: *Frogs* conceal themselves: All are not free from venomous juices; witness the Gecko, and Geitje or Geckotte.

TORTOISES, even in the egg, are preyed upon

upon by various animals; Sharks, the feline tribe of quadrupeds, Otters, Eagles, Hawks, and Pelicans. They feed on worms, those which frequent the sea likewise eat fuci and other marine plants; when in captivity, they eat almost indiscriminately of whatever they can get. They often remain a whole month in the act of propagation. They can subsist longer in noxious air than other animals. They are extremely tenacious of life, insomuch that they live several days after the head is taken off, and respire for a long time after the thorax is laid open. Those of the genus which inhabit the land, undergo hibernation during the winters of cold countries.

Their shelly coverings consist of two shields, united at the edges: That which

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defends

defends the back is convex, and has the ribs impacted into its substance, its edge being covered by twenty-four plates of horney consistence, called tortoise-shell, and its disk by thirteen plates : The under shield is flatted at the breast, more concave in males than females, blunt in the fore part, and notched behind, being divided by seams into various horney plates. In the fore part of the body an opening is left for the head and fore legs, and one behind for the hind legs and tail, which are mostly retractile.

From the general similarity of their structure, the variations in the same species from age, and the imperfect knowledge which we have of most of them at different periods of life, the marks of distinction are imperfect and difficult. Their history is much wanted.

In

In FROGS, the body is short, the head broad and thick, and they may be said to differ only from Lizards by having no tail. They feed on insects; propagate in their fourth year; and scarcely live more than twelve. In most of the species, the fore feet have four toes without membranes, and the hind feet five webbed toes, all of which are destitute of claws. They are very salacious, strongly adhering to the females for days and weeks, while she extrudes her naked eggs. When the young first come from the eggs or spawn, they have neither legs nor feet, and are called *Tadpoles*, having vertically flattened tails like fish, which gradually waste away as the legs sprout forth. In the tadpole state, they have a kind of gills, or subsidiary lungs: Many have a slender tube on the under lip, by which

they can fix themselves, by suction, to other bodies; and some have a small pipe near the left eye, through which they spout water. In the season of propagation, the inner toe or thumb, on the fore feet of the male, is covered with warts. *Toads* go out mostly by night, and frequent shady places, having a lurid disagreeable aspect: Their eggs, when extruded, are connected together like a string of beads. *Frogs*, properly so called, are more active, go about by day, and bask more in the sun. Their eggs, when extruded, are in a confused mass.

LIZARDS are mostly inhabitants of the warmer regions, and are more nimble and active than the other animals of the order of amphibious quadrupeds. They live on insects,

insects, except the crocodiles; and are all harmless, except the Gecko and Getjie. Many of them are good eating. Most of them, especially such as inhabit the water, undergo metamorphoses similar to frogs. *Crocodiles* open their mouths wider than all other animals, both jaws being moveable, and their bodies are armed or defended with hard callosities. The *Chameleons* climb trees with the assistance of prehensile tales; they walk slowly and unsteadily, keeping mostly on the branches of trees, where they catch flies by means of their excessively long and slender tongues; they have no teeth; their eyes are extremely large, and are placed in very much wrinkled bags; their heads are angular; their skin is covered by very transparent and bright tubercles or scales.

SERPENTS resemble fish, having no feet, but are distinguished from them by having lungs, and by the want of fins. Their eggs are connected into a chain, and they are furnished with a double prickly penis ; their affinity to lizards is very considerable, and frogs are nearly allied to those, so that the limits between the three are difficultly fixed.

Thrown in a manner naked into the world, and destitute of the assistance of limbs, they are exposed to every injury. But nature has endowed them with peculiar weapons of the very worst kind ; being provided with horrid empoisoned daggers, of different degrees of virulence in the different species ; though all are not thus armed, luckily only the minor part of the order.

der. These abominable weapons are extremely similar to teeth, but are placed without the upper jaw, having the power of being exerted and retracted, by means of appropriate muscles. Near their roots are placed bags containing a sanious fluid, which instilled, through hollows in the fangs, into a wound, produces the most direful effects. All are not however equally provided with this terrible gift: Perhaps scarcely a tenth part of the whole. Such as are known to be venomous are marked as such, thus, († ;) but heaven, who hath created them crafty, hath given to all men a dread of all the species of the genus. In its beneficence to man, Providence hath given, to India the Ichneumon, and Ophiorhiza; to America, Hogs and Senega; to Europe, Storks and Oils, as destroyers of
 serpents,

serpents, and antidotes to their bite. On the authority of Jacquin and Forskal, the Marfii and Pfylli of America and Arabia, charm the most venomous serpents by means of certain species of *Aristolochia*.

In consequence of the great distensibility of their jaws, which are not articulated, and the great laxity of their gullets, serpents are able to swallow at once, morsels that are twice or thrice as thick as themselves, and they swallow all their food without mastication. Their colours are subject to great variation, at different seasons of the year, at different periods of their age, and from difference in modes of living, and are much changed by preservation, being liable to decay altogether, or to change to other colours after death. Their scales and
plates

plates are likewise subject to be displaced. From these circumstances their distinctions are difficult and uncertain.

Most of them secrete a stinking exudation from certain glands. In cold countries they suffer hybernation; in early spring, they throw off a pellicle or skin, and are supposed to continue to live and grow almost without end. The skin is reticulated; the backbone cartilaginous; the belly as well as the thorax is surrounded by ribs; the tongue is long, slender, and bifid.

In the genus of vipers, *Colubri*, a considerable number of the species are venomous. All the species of rattle-snakes, *Crotali*, are endowed with venom, but they hardly ever bite mankind unless injured or provoked;

ed ; neither is the effect of their bites always necessarily mortal. The rattle-snakes are only found in the warmer parts of America ; and are named from a kind of rattle, composed of articulated hollow membranes as hard as bone, on the end of the tail, which they shake and make a noise with before they bite. These articulations increase with years, and as far as forty have been counted. The head is broad, and is covered with large ridged scales. The muzzle is round and blunt. In the *Boa* genus, the head is similar, but the tail ends in a point, the body is gross, and they are destitute of venom : These are found in the warmer parts of Asia and America, especially its southern division.

The distinctive marks of species, in this
genus,

genus, are extremely ambiguous and uncertain. Colour is exceedingly liable to variation, from various causes. Prints are less liable to error than preserved specimens. In giving the numbers of plates on the belly, and under surface of the tail, it is necessary to be extremely cautious, lest any have been removed, or that a wrong enumeration of either may take place; therefore the combined number, as well as the two separate numbers, ought to be noted. The proportion which the two divisions of the body, above and below the vent bear to each other, is a good assistant mark; but great care must be taken, in the examination of specimens, that a mutilated tail has not been appended.

AUTHORS.

AUTHORS on the Natural History of Amphibious Quadrupeds and Serpents are scarce. *Seba* has published and excellently engraved a prodigious number; but he knew nothing almost of their history, and gives very slight descriptions. *Catesby* has very beautifully represented and described several species. Gronovius, Boddaert, Garden, Pallas, Pennant, Schloffer, Bloch, Hornstedt, Beireis, Schrank, Molina, Sparrman, S. G. Gmelin, Lepechin, Blumenbach, Cetti, Scopoli, Walbaum, Gottwald, have added considerably to the number of species, from the plates and descriptions of authors; it had been better if they had made observations themselves. Laurenti, and particularly Boddaert, have taken great pains to reduce the notices of authors into regular order. Schneider has been most laborious

laborious with regard to the genus of *Tortoise* ; Hottuyn with *Lizards* ; Forskall, Merck, Boddaert, and Weigel, have reduced the genus of *Serpents* under better order ; Camper, the prince of comparative anatomists, has elucidated the structure of their organs, particularly the organs of voice, in several of the species.

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* In the text, this and the next species are numbered by mistake xxxiv and xxxv.

ERRATA.

Page 325. l. 14. for XXXIV. read I.

330. l. 3. for XXXV. read II.

341. l. 23. for viridi faquatica, read viridi aquatica.





Archer Sculp^t

1. Chameleon—2. Scink, p. 42.

NATURAL HISTORY

OF

OVIPAROUS QUADRUPEDS.

IV. DIVISION.

OF LIZARDS,

Having five Toes on each fore Foot, without transverse bands on the Belly.

ART. XXVI. THE CHAMELEON*.

THE name of this animal is very famous, and has long been metaphorically employed, to denote the most abject
VOL. II. A flattery.

Chame-
leon.

* Le Caméléon. Encyclop. method.

Χαμαιλεων, in Greek; Chamaeleo, in Latin; Taitah, or Louiah, in Barbary, according to Shaw.

Lacerta

2 OVIPAROUS QUADRUPEDS.

Chame-
leon.

flattery. Few, however, know, that the cha-

Lacerta chamaeleo: Of a grey colour without any crest, having five toes on each foot, joined two and three together; the tail being round, shortish, and incurvated. Syft. Nat. ed. Gmel. i. 1069. G. 122. sp. 20. Amoen. Acad. i. 290, 501. Mus. ad frid. i. 45. Hasselqu. it. 297. Gronov. Mus. ii. 76. n. 50. Olear. Mus. 9. t. 8. f. 3. Barthol. cent. ii. chap. 62. Best. Mus. t. 12. Valent. Mus. lib. iii. chap. 31. Kirch. Mus. 275. t. 293. f. 44. Seb. Mus. i. t. 82. f. 2. 4. 5. Johnst. quadr. t. 79. Aldr. quadr. t. 670.—*Chamaeleon terrestris*. Calceol. Mus. 658. t. 661.—*Chamaeleo parisiensis*. Laurent. amphib. 45. n. 60.—The Chameleon, Ray, Synopf. 276.—Large grey Chameleon. Brown, Jam. 464.

Chamaeleo mexicanus. Laur. amphib. 45. n. 59. Seb. Mus. i. t. 82. f. 1.—*Chamaeleo candidus*. Laurent. amphib. 46. n. 63.—*Chamaeleo capite-praegrandi*. Parsons, Naturf. v. 184. (†).

Chamaeleo africanus. Laur. amphib. 46. n. 62. Seb. Mus. i. t. 83. f. 4.—*Chamaeleo zeylanicus*. Laurent. amphib. n. 61.—*Chamaeleo bonae-spei*. Laur. amphib. 46. n. 64. Seb. Mus. i. t. 83. f. 5. (‡).

† These three are considered as varieties of the common chameleon, in the *Systema Naturae*; and the other three, marked ‡, are placed as distinct species, except the *Ch. zeylanicus*, which is omitted. They are all given merely as synonymes or varieties, by M. de la Cèpede.—T.

chameleon is a lizard, and still fewer are acquainted with its peculiar features, and its distinguishing characters. It has been said, that the chameleon often changes its shape ; that, having no proper colour of its own, it assumes that of every object which it approaches, like a faithful mirror, and that it feeds on nothing but air. The ancients were fond of repeating these fables, believing that, in this fantastic being, created only and nourished in mistake, they beheld a striking likeness to most courtiers. They have employed this imaginary animal as a comparison for those despicable cringing wretches, who, having no opinion of their own, bend themselves into every possible form, embrace every current opinion, and feed themselves only with smoke and vain expectations. The poets, especially, have eagerly employed all these pretended resemblances, which, in consequence of their almost absolute want of truth, could therefore be the more readily amplified to serve their purposes : They have painted, with all the powers of the most lively imaginations, an

4 OVIPAROUS QUADRUPEDS.

Chame-
leon.

infinity of comparisons and similies, drawn from this fabulous animal, which they considered as acting through fear that part which is performed by courtiers from taste; and these fine images have been copied and multiplied, from hand to hand, by the best writers of all ages. Though no animal whatever unites all the imaginary properties, to which we owe so much rich imagery, yet these delightful fictions certainly contribute to augment the charms that are contained in the works of the poets. The chameleon of the poets has certainly never existed in nature; but it may and will always exist as the creature of genius and fancy. After throwing away all the fabulous qualities that have been attributed to the chameleon, when we shall have described it such as it really is, it will still deserve to be considered as one of the most interesting animals to naturalists; by the singular conformation of its various organs, by the remarkable habits which depend on these, and even by its extraordinary real properties, which are not extremely different from

from those that have been falsely attributed to it by the poets*.

Chameleons are found of various sizes, but are seldom above fourteen inches long. The individual from which the description in this article is formed, which is preserved, along with several others, in the Royal Cabinet, measures fourteen inches three lines in its whole length, of which the tail is seven inches. The length of its legs, including the toes, is three inches.

The head is flattened on the top and at both sides: Two elevated ridges, rising from the muzzle, pass almost immediately over each eye, of which they follow the curvature, and unite in a point at the back of the head, where they are joined by a third that rises from the middle of the head, and by two others that reach upwards from each corner of the mouth. The neck is

A 3

very

* In the Natural History of Pliny, lib. xxviii. chap. 29. may be seen all the chimerical virtues attributed to this animal by the ancients; and the second book of Gesner contains all the absurd fables that have been published relative to this animal.

6. OVIPAROUS QUADRUPEDS.

Chame-
leon.

very short, the underside of the head and throat being puffed out, as in the guana; but much less in proportion than in that animal.

The whole skin of the chameleon is strewed over with little knobs, like shagreen: These are extremely smooth, and more remarkable on the head, and are surrounded with minute, and, almost imperceptible, grains. A row of small pointed and conical eminences adorns the edge of each of the projecting ridges on the head, and similar rows extend along the back, the tail, and the underside of the body, from the muzzle to the anus. The nostrils are placed at the tip of the muzzle, which is somewhat rounded. These nostrils must be of more than ordinary use in the respiration of this animal, since the mouth is frequently so very accurately closed, as to render it difficult to perceive the line which separates the lips. The brain is extremely small, seldom exceeding a twelfth part of an inch in diameter. The openings of the ears are either so small as not to be perceptible, or they

they are altogether wanting : Even the internal organs of hearing are so minute as to have escaped the observation of the gentlemen of the Academy, who believed that they did not exist * ; but M. Camper, has lately informed us, that he had undoubtedly detected them. This circumstance is an additional proof of the slight sensibility of the organs of hearing in oviparous quadrupeds in general, and is, in all probability, one of the causes which produce the appearance of stupidity, that has been observed in this species.

Cham-
leon.

The two jaws are naked, and serrated at their edges, so as in some measure to answer the purpose of teeth : Of this fact we are perfectly assured, by the inspection of several skeletons of chameleons in the Royal Cabinet, notwithstanding that Prosper Alpinus † almost denies the existence of these dentated bones. Almost every circumstance in the structure of the chameleon is singular.

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* Mem. for a Nat. Hist. of Anim. article Chameleon.

† Hist. Nat. Ægypt. lib. i. chap. 5.

8 OVIPAROUS QUADRUPEDS.

Chame-
leon.

lar. The lips are divided, even beyond the extremity of the jaws, where their opening is continued considerably downwards. The eyes are large and very prominent, and instead of having moveable eyelids, like all other quadrupeds, each eye is covered by a rough membrane, like shagreen, attached to the eye-ball, and following all its motions. This membrane is divided by a narrow horizontal slit, through which a bright pupil, as if bordered with burnished gold, is seen. In general the eyes of lizards, and all other oviparous quadrupeds, are excellent: In them, as in birds, the sense of vision seems the most perfect of their faculties; but in the chameleon this appears to be still more exquisite than in all other animals, infomuch that their eyes would, in all probability, be greatly injured by the intensity of light, in the warm climates they inhabit, if it were not for the protection that is afforded by this extraordinary conformation. This wonderful structure, with which nature has provided them, resembles a good deal the artificial defence employed
by

by the Laplanders, and other northren nations, for defending their eyes against the excessive reflection of light from the surface of the snow, by means of a narrow slit in a thin piece of wood. Perhaps, instead of this natural defence being intended to preserve the acuteness of vision in the eyes of the chameleon, it may be the cause of that property ; as their eyes, less fatigued by too strong admission of light, may thereby acquire greater sensibility and acuteness. Besides the above described singularity in structure, the eyes of the chameleon have another property, which seems to belong exclusively to this animal, as well as that other circumstance : They are each moveable independent of the other, so that one eye sometimes looks forward, while the other is turned backwards ; or one looks up, while the other sees such things as are below *. By this means the animal enjoys a much larger field of vision than it could do without this uncommon power ; as, from the

* Le Bruyns Voyages to the Levant.

10 OVIPAROUS QUADRUPEDS.

Chame-
leon.

the great narrowness of the slit through the membrane, a very minute pencil of rays only can pass in one direction, and at one time, and consequently the field of vision to each eye must be very limited.

These remarkable characters, which have been described, and which render the chameleon a singular and isolated species in the order, are not the only extraordinary conformations which it presents. The tongue is round, and usually from five to six inches long, resembling a common earth worm in figure: It terminates in a thick hollow knob, attached to a cartilaginous stile or process, on which it can be contracted at pleasure; and this uncommon apparatus is continually covered over by a viscous humour, which serves to catch beetles, grasshoppers, ants, and other insects, on which the chameleon feeds. It darts out this tongue with astonishing quickness against any of these insects, and draws it back again with its prey, as if glued to the tip*.

The

* Belon, Observat. lib. ii. chap. 34.

The chameleon stands rather higher on its legs than most other lizards, so that it has more the appearance of walking than crawling, as was observed long ago by Aristotle and Pliny. Each foot has five very long, and almost equal toes, armed with strong hooked claws; but the skin of the leg extends to the very tips of these toes, enveloping them in a very singular manner, so as to form two bundles of toes on each foot, one consisting of three toes and the other of two: On the two fore-paws, the bundle containing three toes is on the inner side of the foot, while on the hind-feet the inner bundle only contains two. Some writers have asserted, that there were some species of chameleons having the toes separated from each other; but they must undoubtedly have mistaken some other kind of lizard for this species, perhaps the Tappaxin, the head of which has some resemblance to that of the chameleon. We have formerly had occasion to remark, in the article appropriated to the dragon, how much the presence or absence of a membrane between

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tween the toes influenced the habits of lizards, by rendering them either fitted to climb trees, or to swim in the water with facility. We shall not therefore be surprised, that the singular structure of the feet of the chameleon, should render its natural habits extremely different from those of most lizards. Its feet are by no means fitted to serve as oars for swimming, but they are admirably adapted for keeping fast hold of the branches of trees and shrubs, which it frequents in search of food. It is able to grasp these branches, holding one of the bundles of toes forwards and the other behind, or one on each side, as is done by woodpeckers, cuckows, parrots, and other birds, which enables it to fix itself very firmly. In walking on the ground, however, this conformation by no means affords a firm support; hence it keeps almost continually on trees. In this it is farther assisted by the nature of its tail, which is long and prehensile, like that of the sapajous, and is very strong: Being enabled to lap it round the branches, with considerable force,

it

it may be said to use it as a fifth hand, or paw, to prevent it from falling, and to assist in passing, with greater ease and safety, from one branch to another. Belon informs us*, that the hedges in the gardens near Cairo, especially along the banks of the Nile, contain great numbers of chameleons; which, he alledges, keep in that situation, on purpose to avoid the vipers and cerastes, which swallow them whole when they can get hold of them. They are not, however, safe from the ichneumon, or from birds of prey, even in these hedges. The chameleon, from the peculiar structure and use of its tail, may be considered as analogous, among oviparous quadrupeds, with the sapajou of the viviparous class. But, though it passes its life, like that animal, chiefly among trees, and perched on the extreme branches, it possesses none of the elegantly active, and petulant motions of the sapajou. It cannot leap from branch to branch with the swiftness of an arrow,

* Observations, loco sup. citat.

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nor imitate, by the rapidity of its motions, and vast length of its leaps, the flight of a bird: All its motions are extremely slow, in travelling from one branch to another; so that it may rather be said to lie in ambush under the leaves, to catch such insects as may alight on, or come within reach of, its adhesive tongue, than to go in search of prey. The quickness with which the chameleon seizes insects, renders it useful to the Indians, who are rejoiced to see this otherwise innocent animal in their houses. Its manners are so very gentle, that, according to Prosper Alpinus *, a person may push the finger into its mouth, and it makes no attempt to bite. This gentleness of disposition is confirmed by M. Desfontaines, one of our learned professors at the Royal Garden, who has made numerous observations on the chameleon in Africa, having kept several in his house.

Whether climbing slowly along the branches of trees, or concealing itself be-
low

low the leaves in expectation of insects, or walking deliberately on the ground, the chameleon is always extremely ugly in its appearance, having neither agreeable proportions, nor beauty of form, nor elegant movements, to please the eye of the observer, so that no one can attempt to catch, or even to touch it without disgust. When climbing the branches of trees, should they be too large for it to grasp them with its paws, it takes great care to fix its claws strongly into the bark; and, when walking on the ground, it steps forward in a cautious groping manner, never lifting one foot until well assured of the firmness of all the others. In consequence of these precautions, its motions have a ridiculous appearance of gravity, when contrasted with the smallness of its size, and the activity one would expect to find in an animal so similar to those lizards that move about with so much quickness. Thus, this animal, which is so interesting to naturalists, by the singular covering and mobility of its eyes, by the form and structure of its feet and tail,

and

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leon.

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and by almost every circumstance in its figure, manners, and habits, seems only calculated to excite disgust or contempt in superficial observers; and, but for its very extraordinary property of presenting a variety of changing colours, according to circumstances, which has attracted a very marked attention, it would never have become the favourite object of so many poets, and the common allusion of almost the whole world; it would have been allowed to remain unnoticed among the branches, waiting for its uncertain prey, or would only have been observed by attentive naturalists. These various shades of colour are extremely frequent, and very rapid in their changes: They seem, in some measure, to depend on circumstances of climate, age, and sex; so that it is difficult to decide what is the real natural colour; but, in general, it appears to be a grey, of more or less darkness, or more or less on the livid hue*.

When at rest and in the shade for some time, the grains or little eminences on the
skin

* Le Bruyn, Voyages to the Levant.

skin are sometimes pale red, and the soles of the feet are white slightly tinged with yellow. This colour changes, when exposed to the light of the sun: That part of the skin on which the rays of the sun fall; is frequently of a brownish grey, while the unilluminated part is of a beautiful Isabella colour, produced by the mixture of pale yellow, which the granular eminences assume, joined with a clear red, that then appears on the plain skin between the grains. This splendid colouring is usually distributed in blotches, between which the grains appear grey mixed with blue and greenish; and the flat skin is reddish. At other times the whole skin seems of a beautiful green, spotted with yellow. When touched, it often becomes suddenly spotted all over with pretty large blackish blotches, mixed with some green. When it has been wrapped up in a piece of linen, or other stuff, of any colour whatever, it becomes sometimes whiter than usual; but it is thoroughly ascertained, that it by no means assumes the colours of the bodies which are around,

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leon.

that those which it accidentally presents are not extended over the whole of its body, as was believed by Aristotle, and that it is sometimes white, though Plutarch and Solinus have asserted the contrary *.

As the chameleon has scarcely any defensive weapons, and as, from the extreme slowness of its motions, it is unable to escape by flight from its enemies, it is necessarily the prey of almost every kind of animal that may incline to devour it: Hence it is excessively timid, is very easily frightened, and is subject to frequent agitations of greater or lesser intensity. Even in the time of Pliny, it was believed to be the most timid of all animals, and its frequent changes of colour were attributed to these fears to which it was continually subject. The terrors to which it is so much liable may certainly produce these sudden spots of colour, which arise whenever it observes the approach of any new object of alarm ;
for

* Memoirs for a Natural History of Animals, art. Chameleon, p. 31. et seq.

for as its skin, though covered with small grains, is quite transparent, and has none of the scales which defend most species of this order, it may very readily transmit, by means of the brown, yellow, and greenish spots, the expression of such interior motions as are excited in its blood and other humours, by the presence of foreign bodies. Hasselquist, who has observed the chameleon in Egypt with great care, and has dissected several of them with great accuracy, alleges that the change of colour proceeds from a kind of jaundice, that is frequently induced in the animal by various passions, particularly when irritated. Hence, according to that author, it is almost always necessary that the chameleon be angry to enable it to change from black to yellow or green: In this case it only exhibits the colour of its bile, which may readily be seen, when much diffused over the body, on account of the great transparency of its skin and muscles*.

B 2

It

* Hasselquist, Travels into Palestine and Egypt, 349

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leon.

It appears in other respects, that its colour is liable to vary, according as it is subjected to a greater or lesser degree of heat *. In general, its colours are brighter when it is in motion, when it is handled, or when it is exposed to the direct influence of the sun in those warm countries which it inhabits: They are, on the contrary, considerably paler when it is at rest, when deprived of the suns influence, &c. Perhaps the whiteness it assumes after being wrapped up in linen or any other stuff, may proceed from its being thereby cooled. It becomes paler at night, because the evenings are usually colder, especially in France, where this phenomenon has been observed by M. Perrault. It likewise becomes white after death, because then all internal heat and motion are extinguished. Thus fear, anger, and heat, seem to be the causes of all the changes of colours to which it is subject, and which have given rise to so many fables.

This

* Worm. Mus. de pedestrib. chap. xxii. fol. 316.

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leon.

This species possesses, in a very eminent degree, the power of inflating most parts of its body, so as to increase its general size, and to give a full round figure to such parts as are naturally flat and lank. This inflation, or blowing up, is produced by slow and irregular efforts; and proceeds sometimes to such a degree, as to double the usual flaccid size of the animal, extending even into the feet and tail. The inflation continues sometimes during two hours, lessening a little at times, and increasing again, the diminution being always slower in its progress than the increase. The chameleon is often for a great while entirely flaccid; and has then so complete an appearance of leanness, that the ribs, the vertebræ of the back, and all the tendons of its legs, may be seen and counted with great distinctness. In this state, especially when it turns round, it seems a mere animated skin, inclosing a few bones.

This, like all other properties of animals and vegetables, and even of inanimate matter, is by no means exclusively appropriated

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leon.

ted to one species ; and it has only proceeded from inattention that such exclusive properties have ever been considered as belonging to any animal, vegetable, or mineral bodies. Whatever quality exists in any particular species or individual, may be certainly expected to exist in others, varied indeed in degree of intensity ; for all qualities whatever melt away by insensible shades, or gradually change into their opposites. The power of inflation is possessed, in a greater or lesser degree, by almost all the other oviparous quadrupeds, particularly frogs, but by all in a much inferior degree to the chameleon.

In the opinion of M. Perrault *, this property depends on a power possessed by the animal of causing the air to pass from its lungs into the interstices between the skin and muscles. By increasing the volume of its body, without adding to its gravitating matter, this inflation, which it possesses in common with birds, must render

* *Memoirs for a Natural History of Animals*, p. 30.

der the chameleon considerably lighter in proportion, and must assist it to climb among the branches of trees, and may have contributed to determine its residence among trees and bushes. The chameleon likewise, like all other oviparous quadrupeds, can, at pleasure, distend its lungs very considerably, or can satisfy its necessary respiration with a very moderate degree of distention. Hence the lungs of this animal, which are composed of several distinct vesicles, have appeared large to some observers, and small to others; as, when they are fully distended, they cover almost the whole of the viscera, while, on the contrary, they are extremely small when flaccid, and several of their vesicles may very readily escape notice*.

Chameleon.

The palpitation of the heart, in this species, is often so extremely feeble, as not to be felt on placing the finger directly opposite to it†. The chameleon, like most o-

B 4

ther

* Ray, Synops. Anim. 282. See likewise the works of Pliny and Belon on this subject.

† Memoirs for a Nat. Hist. of Animals.

Chame-
leon.

ther lizards, can live a very long time, sometimes almost a whole year, without food; and it is probably from this circumstance, that some authors have supposed it to feed entirely on air *. Its mode of feeding, by means of the singular structure of its tongue, has been already noticed; and Hasselquist informs us, that he has seen the remains of butterflies and other insects in its stomach †.

The structure of the chameleon is not fitted for producing any cry or distinct voice; but, when frightened, it opens its mouth and makes a kind of hissing noise, like that of serpents and several oviparous quadrupeds. It was known to Aristotle and Pliny, that in temperate regions, where there is some degree of winter, the chameleon retires, during the cold weather, into holes of rocks or other retreats, where it probably suffers hybernation, or becomes torpid, till the return of warmth again restores the languid energy of its functions.

When

* Belon, *Observat. lib. ii. chap. 60.*

† Hasselquist, *Voyage into Palestine*, 349.

When it is carried from its native country into others only a little colder, it refuses nourishment almost entirely; keeps itself fixed continually on a branch or some similar body, only moving its eyes occasionally, and soon dies*.

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leon.

The female lays from nine to twelve eggs every year. The eggs are oval, their greater diameter being about seven or eight lines, and they are covered by a soft membrane, like those of the guana, of sea tortoises, &c. We have counted ten eggs within the body of an individual that was sent from Mexico to the Royal Cabinet.

The chameleon is found in all the warm countries, both of the Old and New Worlds, in Mexico, in Africa, at the Cape of Good Hope, in Ceylon, Amboina, &c. It has been the lot of this animal to interest mankind in a variety of ways; having been the subject of many ridiculous tales and agreeable fables, mixed with absurd and fantastic superstitions. In Africa, particularly near the rivers Senegal and Gambia, it is the

* Seba, vol. i. and Bomares Dictionary,

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leon.

the object of religious veneration. In some of these districts, the negroes are enjoined by their religious instructors to assist the chameleon, when it is observed to be in any danger or difficulty; and yet, when dead, they do not scruple to dry its flesh and eat it. The Moors and Arabs of Barbary carry the dried skins of chameleons about their necks, as an amulet to preserve them from the malign influence of an evil eye*.

In the Royal Cabinet, there are two specimens of the chameleon, one from Senegal, and the other from the Cape of Good Hope, which want the triangular elevation or crest that distinguishes the chameleons of Egypt, India, and Mexico. Individuals of the species likewise differ from each other, by the greater or lesser degree of prolongation of the slight serrated ridge along the back and the under parts of the body. From these differences, some naturalists have divided the species into several, as the Egyptian, Arabian, Mexican, Ceylon,

Cape

* Shaws Travels in Barbary and the Levant.

Cape chameleons, &c. : But these slight differences, which make no change in the essential characters and habits by which the species is readily recognized, should not make us refuse to consider the chameleons of these different countries as the same species, though sometimes a little changed or varied in size or form by the influence of climate and other circumstances, according to the age or sex of the individuals.

Chame-
leon.

Mr Parsons * has given the figure and description of a chameleon, that had been sent along with other subjects of natural history to one of his friends, but of which he could not learn the native country. This specimen did not differ, in any remarkable degree, from the other chameleons, either of the Old or New World, except in the form of its crest : This appendage was not confined to the back of the head, but extended forwards, in two indented protuberances, to the tip of the muzzle over the nostrils. It must require additional observations

* Philosophical Transactions, for the year 1768.

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leon.

vations to determine whether this individual, which Mr Parsons has described with great accuracy, belongs to a constantly different race, or if it be only an accidental variety.

ART. XXVII. *THE BLUE-TAILED LIZARD**.

Blue-tail-
ed Lizard.

THIS species is found in Carolina, in North America, and probably inhabits the neighbouring countries. It is of a brown colour, having five yellowish longitudinal lines on the back. The tail is slender, and in general is rather longer than the body, being of a blue colour; from which circumstance the trivial name adopted, both in French and English, from Catesby, is derived; that employed in the *Systema Naturæ*, is taken from the stripes along

* *La Queue-bleue.* Encycl. Method.

Lacerta fasciata.: Having a longish round blue tail; the back being marked with five yellowish lines. *Syst. Nat.* ed. Gmel. i. 1075. G. 122. sp. 40.

Lacerta cauda-caerulea. Catesby, *Nat. Hist. of Carol.* ii. t. 67.—*Lacertus marianus minor.* Petiv. gaz. i. t. 1. f. 1.

along the back. It frequently retires into the hollows of trees, probably to pass the cold season in a torpid state. Catesby says, that this animal is considered as venomous by several of the Carolinians; but that he was ignorant of any fact which could support such an opinion.

Blue-tail-
ed Lizard.

The lizard, called *Americima* in Brasil, which Ray describes on the authority of Marcgrave *, is probably of the same species with this blue-tailed lizard. The *americima* is three inches long, and about the size of a goose quill, the body being almost square. The whole of the back is covered by grey-ash scales; the scales on the head, the sides, and the thighs being brown, and those on the tail blue. The whole surface is very bright and shining, and feels exceedingly smooth. The legs and feet resemble those of the guana in form and structure, the toes being scarcely larger than hogs bristles. It is believed to be venomous by the Brasilians.

ART.

* *Americima*, *Brafilienfibus*; Marcgr. Ray, *Synopf. Animal.* 267.

ART. XXVIII. *THE AZURE LIZARD* *.

Azure
Lizard.

THIS species, which receives its trivial name from the upper part of the body being of a fine azure blue colour, is found in Africa. All its scales are sharp pointed, and stand out like bristles or small spines. The tail is short.

The Systema Naturae gives two varieties of this species, that are found in Brasil, one of which has a deep scarlet bar on the shoulders †, the other is not described ‡. This species is considered, by Linnaeus, as connecting the subdivision of stellio, with that of guana.

ART.

* L'Azuré. Encyclop. Method.

Lacerta azurea: Having a short tail, with rings of scales; all the scales on the body being pointed. Syst. Nat. ed. Gmel. i. 1061. G. 122. sp. 12. Mus. ad. frid. 1. 42. Seb. mus. ii. t. 62. f. 6.

† Var. γ. *Stellio fascia ad humeros saturate spadicea*. Seba, Mus. 1. t. 91. f. 4.

‡ Var. β. *Cordylus brasiliensis*. Laurent. Amphib. 52. n. 82.

ART. XXIX. *THE GRISON* *.

THIS species is extremely small, and Grison.
is found in the east. It is of a grey colour, irregularly spotted with brown, resembling obscure warts. The tail scarcely exceeds the length of the body, and is surrounded by rings of scales irregularly arranged, and of unequal size.

ART. XXX. *THE UMBRE* †.

THIS species is found in several of the Umbre.
warm countries of America. The head is much rounded, the hind head being augmented

* Le Grison. Encyclop. Method.

Lacerta turcica: Of a grey colour, and somewhat warty; the tail being of a middle length, and irregularly ringed. Syft. Nat. ed. Gmel. i. 1068. G. 122. sp. 13. Edw. av. t. 204.

† L'Umbre. Encyclop. Method.

Lacerta Umbra: Having a long round tail; the
nape

augmented by a callous protuberance of some size, entirely destitute of scales. The under part of the throat has a deep fold of skin. The colour of the body is disposed in clouds, and the scales are ridged and sharp pointed, giving the back a streaked appearance. The tail is longer than the body.

ART. XXXI. — *THE PLAITED LIZARD* *.

Plaited
Lizard.

THE hind head of this species resembles that of the umbre, being prominent and destitute of scales. The under side of the neck has two deep plaits or folds of

nape being somewhat crested, the hind head callous and protuberant, and the back streaked. Syst. Nat. ed. Gmel. i. 1064. G. 122. sp. 28. Mus. ad. Frid. ii. 38. *.

Var. β . *Iguana sepiformis*. Laurent. amphib. 47. n. 66.

* Le Plissé. Encycl. Method.

Lacerta plica: Having a long round tail; the hind head being callous, the eye-lids naked, the sides of the neck warty, and the skin of the throat plaited. Syst. Nat. ed. Gmel. i. 1074. G. 122. sp. 30.

of the skin, which distinguish it remarkably from the former species, and from this circumstance the trivial name is derived. The scales of the plaited lizard are conical, so as to give the skin the appearance of shagreen. The skin above the eyes is somewhat indented, having the appearance of being excoriated; and behind each ear are two wart-like projections, garnished with points. The ridge of the back, on its fore part, is somewhat crested, in consequence of the scales on that part being larger than the rest; in which circumstance, this species is allied to the kalot, and agame. An elevated ridge, or fold of the skin, extends from each side of the neck to the upper part of each fore leg, and from thence turns upwards to the middle of the back. The toes are long, being armed with flat claws, and covered underneath with sharp rough scales. The tail is round, being twice as long as the body, and is covered with very small scales, which are scarcely disposed in rings. This species

Plated
Lizard.

is found in South America and India, and is scarcely larger than a finger.

M. de la Cépède considers the lizard described by Pallas, in the Latin supplement to his voyage through different parts of Russia, as either the same, or a variety of this species *. It is called the Helioscope, from a habit of turning up its head and following the motion of the sun. That animal is found in great numbers on the warmest hills in the southern parts of Siberia. It runs very swiftly, but not in such serpentine mazes as the nimble lizard; resembling the Mauritanian species, in general figure, and that subdivision of the genus, called Geckones, in the *Systema Naturae*, in

* *Lacerta helioscopa*: Having the tail imbricated, thick at the root, and sharp at the tip; the head being sprinkled with callosities, and the throat having a transverse fold of the skin. Pallas, It. i. 457. n. 11. Syft. Nat. ed. Gmel. i. 1074. G. 122. fp. 69.

in the length of its toes and the structure of its ears. The head is very much rounded, the lips and nostrils being hardly at all prominent. The eyebrows are somewhat scaly, and the eyelids rough at the edges. The neck seems drawn tight round by a string, having an oblique tubercle, unequally pointed, from the scrag to each shoulder, with a scarlet space usually in the neighbourhood. The body is short, being of a whitish grey or ash colour above, spotted with brown, and as if sandy or rough, and white underneath. The sides are inflated; their upper parts being covered with small warty projections, and their under parts with small sharp scales. The tail is thick at the root, and tapers to a point, being covered with equal scales that lap over each other; the tip being brown, and its under surface of a red or pale colour.

ART. XXXII. *THE ALGIRINE LIZARD* *.

Algirine
Lizard.

THIS lizard, which seldom exceeds the length of a finger, does not certainly derive its minuteness from any defect of heat in Mauritania and Barbary, its native countries, from which it was sent by M. Brander to Linnaeus : Neither can it be alledged, that it is small on account of the scarcity of moisture in these countries, since there is a specimen of this species in the Royal Cabinet, precisely similar to the African individuals, which came from Louisiana, where moisture is equally abundant with heat.

The body is brown above, and yellowish underneath, the scales on the middle of the back being sharpish and somewhat elevated into a kind of ridge ; and on each side

* L'Algire. Encyclop. Method.

Lacerta algira : Having a longish tail, with rings of scales ; the body being marked on each side by two yellow lines. Syft. Nat. ed. Gmel. i. 1073. G. 122. sp. 16. E. Brander.

side of this ridge; there are two longitudinal yellow lines, the undermost of which divides the belly from the sides. The tail is rather longer than the body, diminishing gradually to a point at the extremity, and is surrounded by regular rings of scales.

In the relation of his voyage into Barbary and the Levant, Mr Shaw mentions a lizard, under the name of *Zermounéah*; as very common among the hedges and on the high roads: He does not describe the size of that animal, which is probably the same with the species of this article, only saying, that its ground colour is bright brown, with three or four yellow streaks from one end to the other.

It would appear that the species is likewise found in the southern parts of Siberia; at least, the animal described by Pallas, under the name of Bloody Lizard*,

C 3

seems

* *Lacerta cruenta*: Having a transverse fold under the throat; the tail being surrounded by rings of scales, its upper surface ash-coloured, the lower scarlet, and the tip whitish. Pall. it. 1. 456. n. 13. Syst. Nat. ed. Gmel. i. 1072. G. 122. sp. 64.

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Algirine
Lizard.

seems only a variety of this species. It resembles the specimens from Africa and Louisiana almost in every thing ; having four white lines along the back, and the tail being ash-coloured above, scarlet or blood-red underneath, and whitish at the tip.

ART. XXXIII. *THE STARRY LIZARD* *.

Starry
Lizard.

THE tail of this lizard is usually rather short, or of what is called a middle length, scarcely reaching that of the body ; being taper in its form, and diminishing from the root to the tip. The scales on the tail are

* Le Stellion. *Encycl. Method.*—Stellione, Tarentole, Pistillione, in different parts of Italy ; Tapayaxin, in Africa ; Cossordilos, in Greece, Tournefort, *voy. i.* fig. t. p. 120.

Lacerta Stellio : Having a moderate tail, surrounded by rings of scales ; the head and body being beset with sharp projecting spines. *Syst. Nat. ed. Gmel. i.* 1060. G. 122. sp. 10. *Mus. ad. frid. ii.* 37. *. *Hasselquist. it.* 321.

Cordylus Stellio. Seba, *mus. ii. t. 8. f. 7.* Laurent. *amphib. 52. n. 80.*

are sharp, and are disposed in regular rings or stages. The rest of the body is covered, both above and below, by small pointed scales; besides which, the body and head are armed with sharp projecting tubercles, of various sizes. This species is extremely disagreeable in its appearance; resembling the toad a good deal, especially in the general form of the head; in which circumstances it resembles the tapayaxin, or orbicular lizard, inasmuch that some authors have given the same names to both. Its colours, however, make up in a great measure for the disgusting appearance of its form, being a very beautiful variegation of white, black, and grey, and sometimes green, which are disposed like the colours of marble.

This species is found in all parts of Africa, from Egypt to the Cape of Good Hope: The individual in the Royal Cabinet, from which our description was formed, came from Egypt. It is likewise found in the east, in the islands of the Archipelago, in Judea, and in Syria; in which

Starry
Lizard.

two last^d mentioned countries, according to Belon *, it grows to a considerable size, being as large as a weasel. M. Cetti, in his Natural History of Sardinia, informs us that it is tolerably common in that island, where it inhabits the houses, being called Tarentole by the Sardinians and in several parts of Italy; which name is likewise given to a variety of the green lizard, and even to some others. The starry lizard, however, is chiefly abundant in Egypt; being found in great numbers about the pyramids and the ancient tombs, where they live among the crevices of the stones, feeding on flies and other winged insects.

The pyramids, those almost indistructible monuments of human power and vanity in times far beyond the reach of history, seem destined to present very extraordinary objects of various kinds. Both in ancient and modern times, the excrements of this lizard have been gathered among the pyramids with great care. By the ancients, who

* Observations, Paris edition of 1554, lib. ii. chap.

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who supposed this substance to be the excrement of the crocodile, it was called *Crocodilea* *; and the same name, according to Belon †, is retained by the modern Greeks. Perhaps these excrements would not have been in so much request, had they been known not to proceed either from the largest or the smallest of the lizard tribe; for the extremes of things, whether in greatness or minuteness, are apt to impose on the ignorance of those who are unable to consider the great chain of nature. The moderns, however, being better informed on this subject, have referred that substance to the starry lizard, which possesses no remarkable properties; but the true or false value of its excrement having been already established, it still continues in use, especially among the Turks, who consume large quantities of it as a cosmetic.

Starry
Lizard.

ART.

* *Stercore fucatus crocodili.* Horace.

† Observations, lib. ii. chap. 68.

ART. XXXIV. THE SCINK*.

Scink.

THIS species has long been famous, for an imaginary property of restoring exhausted vigour, and rekindling the fires of love, which have been cooled by age or by excess; and, on this account, it has been much in request in many parts. The Egyptian peasants catch great numbers, which they carry to Cairo and Alexandria, from whence they are distributed through a great part of Western Asia. When recently

* Le Scinque. Encycl. Method.—Σκινξ, or Σκινξος, in Greek.

Lacertus Stincus: Having a round shortish tail, with its tip compressed laterally; the toes being edged by membranes, and destitute of claws. Syst. Nat. ed. Gmel. i. 1077. G. 122. sp. 22.

Scincus. Gronov. mus. ii. 76. n. 49. Raj. quad. 241.
—Scincus officinalis. Laurent. amphib. 55. n. 87.—
Lacerta lybia. Imperat. nat. 906.—Lacertus cyprius
scincoides. Aldrov. ovip. lib. i. ch. 12. Seba, mus. ii.
112. t. 105. f. 3. Bess. mus. i. 12. f. 1. Olear. mus. 9.
t. 8. f. 1. Amoen. ac. i. 294. Haffelqu. act. upf. 1750.
p. 30. Id. it. 309. n. 58.

cently killed, a juice is extracted from their bodies, which is employed as a medicine in several diseases ; or the body, after being dried, is reduced to powder, and that powder is used instead of the juice, and with the same views. Even in Europe, this absurd aphrodisiac has been employed to supply a treacherous strength to the exhausted powers of nature ; though, if it has any effect at all, it serves rather to precipitate than to retard decay, supplying a false enjoyment, instead of those real pleasures that owe all their value to natural sentiments, which can never be excited by fallacious arts. Hasselquist informs us *, that scinks are brought to Alexandria, from Upper Egypt and Arabia, and are sent from thence to Venice and Marseilles, to be distributed to different parts of Europe.

From the peculiar figure and appearance of the scink, it is not much to be wondered that it has often been mistaken for a fish, by such as had only seen it at a distance and close to the water. It certainly has a good

* Voyage to Palestine, 361.

44 OVIPAROUS QUADRUPEDS.

Scink.

good deal the shape of a fish, especially about the head, which seems fixed directly to the body, without any intervening neck; and in its large smooth scales, disposed like tiles, or imbricated, both on the upper and under parts of the body. The upper jaw is longer and broader than the under. The tail is thick, short, and tapering, its tip being compressed, or flattened laterally. The general colour of the upper parts of the body is reddish, with transverse brown bars on the back; the under parts being whitish. It is subject, however, to variety; for the skin is so thin and weak as to suffer different changes of colour, in conformity with certain alterations in the internal organization of the animal. It is peculiarly liable to fade after death; and, in the state of desiccation, and slightly salted, in which it is brought to Europe, it appears of a silvery yellowish white. The colours of this lizard, like most other animals, are always brighter in proportion to the heat of the climate which it inhabits; and are augmented in proportion to the brightness

of the light to which they are subjected; Scink.
for light seems the true and only primary
source of all colour.

According to Linnæus, this species is destitute of claws; though all the dried specimens which we have examined seemed to have claws, and M. Cetti * confirms our supposition. Hasselquist † says, that a small naked space, at the tip of each toe, slightly convex above and concave below, supplies the place of claws.

The scink is found in almost every part of Africa, particularly in Egypt, Arabia, and Lybia, where it is said to be of a larger size than ordinary: It is likewise found in India; and probably inhabits all the very warm countries of Europe and Asia. The choice of its habitation seems to depend, besides the warmth of the climate, on an abundant supply of aromatic vegetables, on which it is said to feed; and on this, probably, depends the stimulant powers which
is

* Hist. Nat. Amphib, and Pisc. Sard.

† Voyage to Palestine.

Scink.

is attributed to it as a medicine. Pliny * informs us, that it was in his days employed as an antidote against the wounds of poisoned arrows. There is no doubt that it may lawfully be used as a remedy for some diseases, if experience should warrant the opinion entertained of its medicinal virtues ; but it ought never to be applied to the vile purpose of disgracing the noblest of the natural passions, by vain attempts to rekindle the flame which vice and excess have effectually extinguished.

The scink frequents the water as well as the land ; and yet it has been ridiculously called the land crocodile by some writers : But surely it is extremely absurd to apply the name of the largest of the oviparous quadrupeds to this small lizard, which hardly ever exceeds seven or eight inches in length. Hence Prosper Alpinus supposes, that the scink of the moderns ought not to be considered as the same animal with that which has been called the land crocodile by the ancients, particularly by Herodotus, Pausanias,

* Hist. Nat. lib. xxviii. chap. 30.



1. Tiligugu—2. Gilded Lizard, *p. 53.* Archer. Sculp.

Paufanias, and Diofcorides, and celebrated Scink.
 by thefe writers for its aphrodisiac and alexipharmac virtues. He fufpects they meant another, and confiderably larger, fpecies of lizard, which is found in dry fituations above Memphis. He gives a figure of that lizard *; but neither his figure nor text give fufficiently precise characters of the animal, to enable us to determine what fpecies it ought to be referred to: The form and fhortnefs of its tail does not admit of its being confidered either as a dragon, tubinambis, or guana.

ART. XXXV. *THE TILIGUGU* †.

THIS fpecies has very confiderable re- Tiligugu.
 femblance to the fcink; but its legs are fhorter in proportion, and the upper jaw does

* Hift. Nat. Ægypt. tom. i. chap. 5. De Animal. lacertof. in Ægypto viventibus.

† In the original, this fpecies is called Mabouya, which name it receives in America from the Indians; but, as the

48. OVIPAROUS QUADRUPEDS.

Tiligugu. does not exceed the length of the lower. It has been called *Mabouya* by some writers, and the same name has been applied by others to another species, called, in this work, the Gilded Lizard. In that species, the tail is longer than the body, while in this it is considerably shorter. The *tiligugu* seems likewise considerably smaller than the gilded lizard, and their manners and habits differ in several essential particulars: We must not, however, suppose them to be two varieties of the same species, occasioned by difference of climate, for both are found in the same climates; but shall consider them as two distinct species, at least till

the same name has been applied to other lizards, that of *Tiligugu*, adopted from the *Systema Naturae*, on the authority of Cetti, is here preferred.—T.

Lacerta Tiligugu: Having a round conical shortish tail; the toes being edged by membranes, and furnished with claws. *Syst. Nat. ed. Gmel. i. 1073. G. 122. sp. 66.*

Tiligugu, Tilingoni. Cett. amphib. Sard. 21.—Mabouya. Dutertre, Hist. Nat. des Antilles, ii. 315. Rochefort, 147.—Salamandra minima, &c. Sloane, Hist. Nat. Jam. ii. t. 273. f. 7, 8.

till accurate observations give us more precise knowledge on the subject. The word Mabouya, which has been employed as a name to the species, signifies, in the language of the American savages, any object which inspires horror or disgust; and, unless it may refer to some of the habits of this species, and of the gilded lizard, it seems by no means applicable to either of these animals, as their form has nothing either horrible or disgusting. Tiligugu.

The head of this species seems, as in the scink, to originate immediately from the body, which gradually grows narrower towards the head and tail. The whole body, both above and underneath, is covered by rhomboidal scales, like those of fishes, overlapping each other in alternate rows; their ground colour is golden yellow, while several of those on the back are blackish, or dark brown, with a small white line along the middle of each. On each side of the body, there is a longitudinal streak of black scales, the ground colour growing lighter on the inside of these two stripes, where

Tiligugu. there are two other longitudinal streaks almost white. The colour, however, of this species is subject to variety, according to the place of its residence: Those that live among rotten trees, in marshy places, and in deep shady valleys, where the rays of the sun seldom penetrate, are almost black; and, perhaps, these may be considered as justifying, in some degree, what has been said respecting their hideous appearance. The scales of these seem smeared over with oil or varnish *. The muzzle is blunt; the openings of the ears are tolerably large; the claws are hooked; the tail is thick, blunt, and very short. The individual in the Royal Cabinet measures eight inches long; but those described by Sloane are considerably smaller, probably because they were not full grown.

This species climbs up trees, and crawls about the posts and beams of the negro huts; but it more generally frequents the clefts and hollows of old rotten wood, from which it only comes forth during the heat
of

* Ray, Synops. Animal, 268.

OVIPAROUS QUADRUPEDS. 51

of summer. When it threatens rain, it is often heard to make a considerable noise, and even frequently quits its lurking places. Sloane suspects that the moisture, with which the air is loaded before rain, causes the wood to swell, and thereby diminishes the capacity of the clefts so much as to force this animal out of its habitation. Perhaps, besides that reason, which may likewise be true, this animal is sensible of the effects of moisture and dryness, in the same manner with frogs, to which most lizards have considerable analogy; and the noise and motion it makes before rain, may be considered as an expression of these feelings. The savages of America believe both this species and the gilded lizard to have venomous properties, but both Sloane and Brown assert that they could never learn any positive proof in support of that opinion. Sometimes they attack boldly such as irritate them, and keep such fast hold as to be very difficultly shaken off.

This animal chiefly inhabits the West India islands, but is likewise found in the

Tiligugu.

Tiligugu. old world, particularly in Sardinia, where it is known by the names of tiligugu and tilingoni. M. Cetti, from whose Natural History of that island this information is derived, and who has given a very accurate description, has observed with great acuteness the circumstances of resemblance and difference between it and the scink; and, not having been acquainted with the descriptions of Sloane, Rochefort, and Duterre, has very naturally supposed it an unknown species.

Professor Thunberg of Upsal, has lately given, in the Stockholm Memoirs*, an account of a lizard of the island of Java, which he calls *Lacerta lateralis*, which appears to be only a variety of this species. He compares it with the scink and gilded lizard, from both of which it differs in various circumstances, particularly from the latter by the thickness and shortness of its tail. It is grey-ash on the back, with four rows of black spots, mixed with spots of brown, and having a longitudinal black streak on each

* April quarter of the year, 1787, p. 123.

each side. M. Afzelius, another learned Swedish naturalist, mentions having seen a lizard, in the collection of M. Baettiger at Westeras, which only differed from that described by Thunberg, in wanting the spots on the back, and in having the lateral stripes of a deeper black, and more equal. Thus the tiligugu is found to inhabit Europe, Asia, and America.

ART. XXXVI. *THE GILDED LIZARD* *.

THIS species is very common in America, particularly in the West India islands, where it is called Mabouya, as well

Gilded Lizard.

D 3 as

* Le Doré. *Encycl. method.*

Lacerta aurata: Having a long round tail, the whole body being covered by round smooth imbricated scales; with brownish sides. *Syst. Nat. ed. Gmel. i. 1077. G. 122. sp. 35. Amoen. Acad. i. 294.—Lacerta barbara. Mus. ad. Frid. i. 46.—Lacertus cyprius scincoides. Aldrov. quadr. 660.—Scincus. Gronov. Mus. ii. 75. n. 48.—Scincus maximus fuscus. Sloane, Jam. ii. t. 273. f. 9.*

Gilded
Lizard.

as the preceding species. Rochefort gives it the name of *Brochet de terre*, or land pike, from some fancied resemblance to the fish of that name. It has likewise been called the land or sea scink, by different writers. In this work, however, the name used by Linnaeus is preferred, as being more appropriate, conveying no false ideas of its nature, and inducing no confusion.

The gilded lizard has several circumstances of resemblance and analogy with the

f. 9. †—*Scincus marinus*. Seba, Mus. ii. t. 10. f. 4. 5. t. 12. f. 6. ‡—*Seps zeylanicus*. Laur. amphib. 59. n. 99.—Galley-wasp. Brown, Jam. 463.—Mabouya, or Scinq de terre. Dutertre, 314.—*Brochet de terre*. Rochefort, 149.

† Sloane represents the tail as considerably shorter than the body: If his figure is accurate, it must have been taken from an accidental variety, as all other naturalists describe the tail of this species as longer than the body, which is the case in the specimens in the Royal Cabinet. Brown likewise asserts, that this species has a considerably longer tail than is usually represented in the engravings of naturalists.

‡ The Lizard referred to, in the *Systema Naturae*, from Seba, i. t. 8. f. 3. as synonymous with the gilded lizard, is of a quite different species.

the scink, and more especially with the tiligugu. The neck, as in these species, is as large as the body and the hinder part of the head. This species, however, is usually considerably larger than the two former; and its tail is a good deal longer than its body, while in the other two species it is shorter. In this species the upper jaw does not, as in the scink, exceed the lower in length and breadth. The openings of the ears are very large, and are garnished on the inside with scales, in such a manner as to appear fringed. These characters are sufficient to distinguish the gilded lizard from the scink and tiligugu; but it resembles these so much, as to have been compared, like them, to a fish, as has been already noticed. It is covered all over by small bright rounded scales, which are somewhat streaked. The toes are all armed with tolerably strong claws. The general colour is silver grey, clouded with orange, growing whiter at the sides*. Like most other animals,

Gilded
Lizard.

D 4

the

* According to Brown, the colours are often very dull, and transversely blotched.

Gilded
Lizard.

the brilliancy of its colours fades after death; but, while animated by the vital warmth, they have a very splendid appearance, like burnished gold, from which circumstance the trivial name is derived; and these colours are rendered considerably brighter, in consequence of the surface being covered all over by a slimy fluid, which has the effect of a fine varnish. From this slime on its skin, and in consequence of the places which this animal inhabits, it has been called a *salamander* by some writers: But those lizards only are to be considered as salamanders that have no more than four toes on each of the fore-feet.

This species is said, in the *Systema Naturae*, to inhabit the island of Jersey, on the authority of Edwards; but the species, cited from the works of that naturalist, is very essentially different from this. It is found in the isle of Cyprus; but its principal habitation is America and the West India Islands. In these countries, according to Sloane, it frequents marshy places; and, according to Brown, is likewise found
in.

in the woods. The legs are so very short, that it may rather be said to crawl, like a serpent, than to walk*: Hence it disgusts by its motions, notwithstanding all the attractions from the beauty of its colours, and the brilliant polish of its surface. It is very seldom met with, except in the evenings, when it crawls out, probably in search of prey. For the most part, it remains concealed in caverns and hollow places of the rocks, from which, during the night, it emits a continual croaking noise, louder and more disagreeable than that of frogs or toads. Brown says that it is sometimes two feet long, but Ray assures that it never exceeds fifteen inches. The specimen in the Royal Cabinet, which served for this description, measures fifteen inches eight lines in total length, of which the tail is eleven inches and one line: The hind-legs, in that individual, are one inch and eleven lines long; the fore-legs, as in all other lizards, being shorter.

This

* Ray, Synops. Animal. 269.

Gilded
Lizard.

This species is considered as venemous, by the inhabitants of the West Indies, who reported to Sloane and Brown, that every person or animal that was bitten by a gilded lizard certainly died, by the next day at farthest ; but both naturalists acknowledge that they never heard any well attested fact on this subject from any very creditable person. Brown adds, that, if they really are venemous, the poison must reside in their saliva, as the teeth are all short, equal, and fixed. Perhaps this lizard and the scink have had venemous qualities imputed to them, on account of their having been called salamanders, particularly as both of these lizards have some resemblances to the true salamanders, in their habits, both on land and in the water. This bad reputation has occasioned the gilded lizard to be persecuted very industriously ; on which account, perhaps, it is extremely timid, and always flies the approach of mankind. It seems to prefer slightly putrid animal substances as food, and is particularly fond of small sea crabs, on which it is able to feed, notwithstanding

standing the hardness of their shells, in consequence of the muscular power of its stomach. On the whole, this animal is more noxious than useful; even when it does not disgust the sight by its disagreeable movements, it offends the ears by its harsh croakings, while the richness of its colours are rendered altogether useless, by its keeping almost constantly concealed in the day.

Gilded
Lizard.

ART. XXXVII. *THE TAPAYAXIN* *.

THE name here given to this species, is adopted, on the authority of Hernandez the Mexican naturalist, in preference to

Tapay-
axin.

* Le Tapaye, contracted from the American name Tapayaxin. Encyclop. Method.

Lacerta orbicularis: Having a round tail of moderate length; the crown of the head having three prickles; and the belly being almost hemispherical. Syft. Nat. ed. Gmel. i. 1061. g. 122. sp. 23. Mus. ad. frid. i. 44.—*Cordylus hispidus*. Laur. amphib. 51. n. 79. Seba, Mus. i. t. 109. f. 6.

Var. β . *Cordylus orbicularis*. Laurent. amphib. 51.
n,

Tapay-
axin.

to the trivial name employed by Linnaeus ; as it is thought better to preserve to animals, where these are known, the names they are known by in their native countries, than to use arbitrary appellations, derived too often from mistaken or fancied circumstances in their form or history. The tapayaxin has some analogy with the starry lizard, but is remarkably distinguished by its back being beset all over with sharp prickles *. The body is so bulky, especially at the sides and belly, as to be almost as broad as it is long, which has induced Linnaeus, following other natural historians, to give it the trivial name of *Lacerta orbicularis*, or the spherical lizard. The belly is destitute of transverse bands, or semi-circular rows of scales. The tail is short, at least does not exceed the length of the body. The toes are covered with scales both

n. 78.—*Lacertus orbicularis spinosus*. Seba, Mus. i. t. 83. f. 1. 2.—Tapayaxin, *Lacertus orbicularis*. Hern. mex. 327, 328.—*Lacertus orbiculatus*. Ray, Synops. quadr. 263.

* This seems to be the case in both varieties quoted from the *Systema Naturae* ; the former being, most probably, distinguished from the latter, by having three remarkable prickles on the crown of the head.—T.

both on their upper and under surfaces. The ground colour is whitish grey, more or less spotted with brown or yellowish. A variety of this species occurs, which is distinguished by having a triangular head, somewhat like that of the chameleon, the upper surface of which is covered by a kind of buckler.

Tapay-
axin.

As both this species and the starry lizard are covered by prickles, it is not surprising that travellers have, at first sight, been deceived into a mistaken notion of their identity, though they differ in several essential particulars; from that supposed resemblance, however, the starry lizard has received, from some writers, the same name with this species.

The tapayaxin is by no means an agreeable object; the thickness and general proportions of its body giving it very much the appearance of a toad, furnished with a tail and beset with prickles: But the gentleness of its manners soon effaces its deformity, the effect of which is considerably diminished by the beauty of its colours.

Its

Tapay-
axin.

Its prickles seem only intended for defence, as it never attempts to do the smallest injury. It becomes readily tame ; allows itself to be handled, without ever offering to bite, and even seems fond of being caressed, appearing pleased at being turned over and over. Some parts of its body are extremely sensible, particularly about the nose and eyes, where, we are assured by some writers, it bleeds on the slightest touch. Ray informs us, that this innocent animal, dried and powdered, is used as a remedy in some diseases.

ART. XXXVIII. *THE STRIPED LIZARD**.

Striated
Lizard.

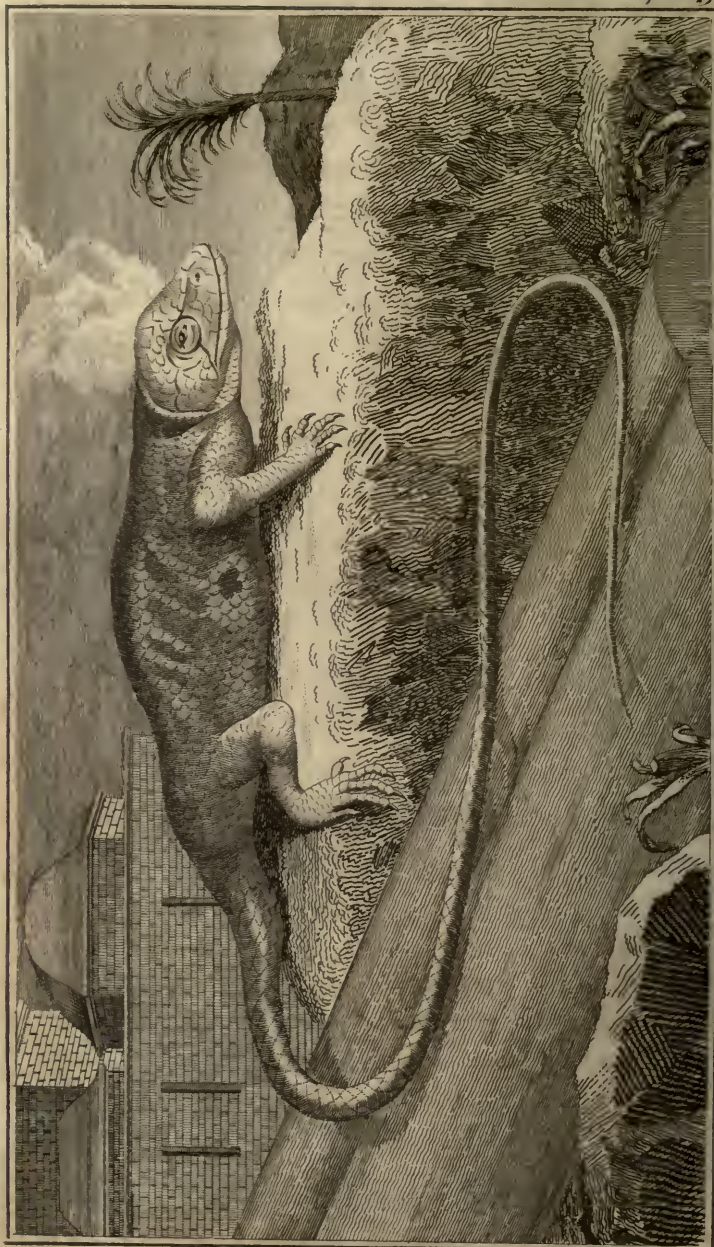
THIS lizard is found in Carolina, and was communicated by Dr Garden to Linnaeus. The head is marked by six yellow

* Le Strié. Encyclop. Method.

Lacerta quinque-lineata : Having a round tail of moderate length ; the back being marked by five whitish lines. Syft. Nat. ed. Gmel. i. 1075. G. 122. sp. 24. Garden.

The first of these is the fact that the United States is a young nation. It was founded in 1776, and has since that time been growing in size and power. The second is the fact that the United States is a democratic nation. It is a nation in which the people have the right to elect their representatives, and in which the government is responsible to the people. The third is the fact that the United States is a free nation. It is a nation in which the people have the right to free speech, free press, and free assembly. The fourth is the fact that the United States is a peaceful nation. It is a nation in which the people have the right to live in peace and harmony with one another.

The fifth is the fact that the United States is a nation of immigrants. It is a nation in which people from many different parts of the world have come to live and work. The sixth is the fact that the United States is a nation of pioneers. It is a nation in which the people have a spirit of adventure and a desire to explore new lands. The seventh is the fact that the United States is a nation of inventors. It is a nation in which the people have a talent for creating new things. The eighth is the fact that the United States is a nation of heroes. It is a nation in which the people have a sense of duty and a willingness to sacrifice for their country.



Marbled Lizard.

Archer. Sculp.

low streaks, two of which are between the eyes, one over each eye, and one below each. The back is blackish, having five longitudinal whitish lines, extending from behind the head to the middle of the tail. The tail is round, and without ranges of scales, being one half longer than the body. The belly is streaked, and is covered by scales lapping over each other in alternate rows.

Tapay-
axin.

ART. XXXIX. *THE MARBLED LIZARD*.*

THIS species is found in Spain, Africa, India, and America, in which last country it is often called Temapara; but, as that name has likewise been applied to other

Marbled
Lizard.

* Le Marbré. Encyclop. Method.

Lacerta marmorata: Having a long round tail; with a smooth back; the throat being slightly crested, with indentations on its fore part. Syft. Nat. ed. Gmel. i. 1065. G. 122. sp. 31. Amoen. acad. i. 129. 288. Mus. ad. frid. i. 43. Edw. glean. t. 245. f. 2.—Temapara. Seba, Mus. i. t. 88. f. 4. ii. 76. f. 4.

Marbled
Lizard.

other species, it is here rejected, on purpose to avoid introducing uncertainty and confusion into our nomenclature. In both worlds, it seems to thrive better the nearer it inhabits to the torrid zone. The head is covered by large scales; the under part of the throat is furnished with a range of small scales, extending, like a kind of crest, towards the breast, and notched or indented on its edge, this appendage being more remarkable on the male than the female. The belly has no transverse bands. The under side of the thighs have each a longitudinal row of eight or ten tubercles, which are not so obvious on the female. The upper surfaces of the claws are black. Its most remarkable character is the length of its tail, which exceeds that of any other lizard in proportion to its body: In one specimen in the Royal collection, sent from India by M. Sonnerat, the tail is four times the length of the body and head, having the scales so disposed as to give it the appearance of nine longitudinal ridges. The colour of this species is greenish on the head, greyish on the

the upper parts of the body, transversely streaked with white and black; this becomes reddish on the thighs and sides of the belly, where it is marked with white and brown. The tail is marked by hollow reddish spots.

Marbled
Lizard.

The African lizard, named Warral by Shaw, and Guaral by Leon, belongs apparently to this species. According to Shaw, the warral is sometimes thirty inches long, probably including the tail; and its colour is bright red, with blackish spots. This red colour is not very different from the redness on the marbled lizard, the colour of which at least comes nearer that of the lizard mentioned by Shaw, than any other African species. Shaw mentions, that the warral strikes its tail against the ground whenever it stops, which circumstance accords very well with the structure of the marbled species, which has a very long slender tail, which may be easily agitated. The Arabs, according to Shaw, believe that a woman certainly becomes barren, if struck by the tail of this lizard.

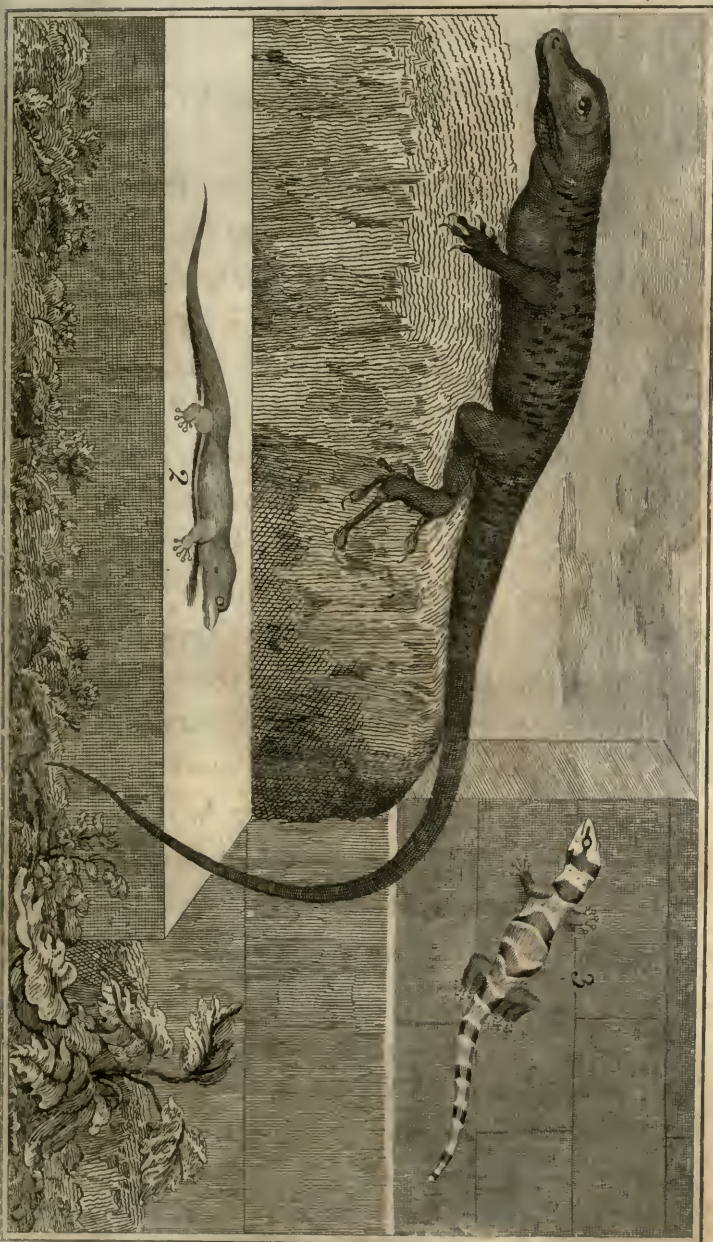
ART. XL. *THE ROQUET* *.

Roquet.

WE have chosen this name for a lizard which was sent from Martinico to the Royal Cabinet, under the appellation of anolis, or garden lizard. It is by no means the anolis of Rochefort and Ray, but resembles very much the animal described by Dutertre and Rochefort, under the name of roquet; and as these naturalists were acquainted with both, in their native countries, we have chosen to follow their opinions on the subject, which have likewise been adopted by Ray. The term anolis has been applied to other species, very different from either this or the true anolis, which has been formerly shown to be the same with the ameiva, from which the present species differs essentially, though it likewise agrees in several particulars.

The

* Du Tertre, ii. 313. Rochefort, 147. Ray, Synopf. 268.—*Lacertus cinereus minor*, least light brown, or grey, lizard. Sloane, Jam. ii. t. 273. f. 4.



1. Roquet. — 2. & 3. Spitting Lizard, *Archer. Sculp.* p. 77.

OVIPAROUS QUADRUPEDS. 67

The roquet resembles the nimble lizard, Roquet. formerly described, in several circumstances of its figure and structure; but differs materially from that species, by wanting the transverse bands of scales on the belly. It is never of any considerable size: That in the Royal Cabinet measures two inches and a half long, exclusive of the tail, which is twice the length of the body. The roquet described by Ray was considerably shorter, the body and head being only one inch, and the tail an inch and a half long. The general colour is like that of a withered leaf, spotted with yellow and blackish. The eyes are very bright, and the nostrils are tolerably large. Its manners and habits are extremely similar to those of the nimble lizard. Like that species, it frequents gardens, and is very active, its fore-legs being long, which, raising its body from the ground, contributes to its agility. The claws are long and hooked, which enable it to climb with facility. In running, it always carries the head a good deal elevated, which attitude increases the agreeableness of its

Roquet.

appearance and motions. It runs about with amazing swiftness, in sudden and interrupted jerks, that are compared, in their rapidity, to the flight of a bird. It seems to prefer moist situations, and is frequently found among stones, seeming to be fond of leaping about from one to another. Both in running and when at rest, it always keeps the tail reflected over its back, in the same manner with the Carolina species, which we have described under the name of lion lizard; and it bends its tail, which is very slender, into the form of a circle. Notwithstanding the rapidity of its motions, and the apparent petulance of its manners, it is in reality very harmless, and even docile, affecting the company of mankind, like the nimble and green lizards. When fatigued by its rapid movements, and overheated, it stops for a time with its mouth open, pushing out a large divided tongue, and pants like a dog that has taken violent exercise. It is probably from this habit, joined to the usual turned up form of the tail, that it has received the trivial name of roquet,

roquet, which is given in France to a particular small kind of dog. It destroys great numbers of insects; and as it easily and frequently goes into small holes in the ground, in those places which it frequents, some have alledged that it feeds much on the eggs of other lizards and small tortoises, which, being only covered by soft membranes, give hardly any resistance to its teeth. We have already seen some similar circumstances in the manners of the nimble lizard: And the greater degree of greediness for food, which has been observed in the roquet, may very fairly be attributed to the greater warmth of the West Indian climate.

Roquet.

ART. XLI. *THE RED-THROATED LIZARD* *.

THIS species, which is usually about six inches long, is found in Jamaica on the hedges and among the woods. Its

Red-throated
Lizard.

E 3

gene-

* Le Rouge-gorge. Encyclop Method.

Red-
throated
Lizard.

general colour is green, being particularly distinguished by a globular protuberance, or hollow bag, under the throat, which it blows up at pleasure, particularly when pursued or frightened; which appendage is of a red colour, forming a very elegant contrast with the fine green colour of the rest of its body.

M. de la Cèpede asserts, that this species has no transverse rows of large scales on its belly; but this is probably a mistake, as it is placed by Linnaeus in that division of the genus which he terms *ameivae*, that are particularly distinguished by abdominal scutæ, or transverse rows of squared scales, somewhat like those on the belly of most serpents.

ART.

Lacerta bullaris: Having a long round tail; with a globular red protuberance under the throat. Syft. Nat. ed. Gmel. i. 1073. G. 122. sp. 32.—*L. viridis jamaicensis*. Catesby, Carol. ii. t. 66.

ART. XLII. *THE STRUMOUS LIZARD**.

THIS species, which inhabits Mexico and South America, is of a pale grey colour, with brown spots on the upper part of the body, and having deep grey transverse streaks on the belly. The fore part of the breast has a large protuberance, pointing forwards, covered with small red grains: From this the trivial name is derived, as it has some resemblance to the bronchial swellings, so common in some districts among the Alps, called goitres. The tail is long, round, and of a livid colour, which becomes greenish about the root.

Strumous
Lizard.

This lizard is very active in its motions,
neat in its appearance, and is prettily co-
loured,

E 4

loured,

* Le Goitreux. Encyclop. Method.

Lacerta Strumosa : Having a long round tail ; with a considerable protuberance on the fore part of the breast. Syft. Nat. ed. Gmel. 1. 1067. G. 122. fp. 33.

Salamandra strumosa. Laurent. amphib. 33. n. 53.

—*Salamandra mexicana strumosa*. Seba, mus. ii. t. 20.
f. 4.

Strumous
Lizard.

loured, but not so bright or elegant as the red-throated species. It is very familiar with mankind, running about in houses without apparent fear, and even climbing on the tables and on the people that sit round them. Its motions and attitudes are agreeable : It seems to examine every thing that comes in the way with attention, and has even the appearance of listening to what is said. It climbs readily on trees, living on flies, spiders, and other insects. When two of this species meet, they sometimes fight with great violence : They approach each other boldly, agitating their heads in a menacing posture ; the protuberance on the breast and the throat become inflated ; their eyes seem on fire with rage ; and at last they attack each other with fury. When one of the combatants is worsted, it runs off, and is pursued by the victor, who devours his enemy, if he can seize him ; the pursuer often, however, catches hold of the run-away by the tail, which breaks off ; and, while he stops to swallow this part, the vanquished enemy gets time to escape.

Other

Other lizards of the same species very often stand quiet spectators of this combat : These are probably females, which await the event, and become the prize of the victor. Individuals of the species are often met with that have lost their tails, probably in these combats. These mutilated lizards are timid, weak, and languid : A kind of callus or cicatrix forms at the part where the tail has been broken away ; and it would appear that, in this species, the tail is not always reproduced when lost.

Strumous
Lizard.

P. Nicolson, who gives an extended account of this species, in his Natural History of St Domingo, gives it the name of anolis ; but the figure in his book is evidently that of the animal we have described in this article.

ART. XLIII. *THE TEGUIXIN* *.

THE teguixin is found in South America, and perhaps likewise in India. It is whitish, verging on blue, with dark grey

Teguixin.

* *Lacerta Teguxin* : Having a long round tail ; the
fides

Teguixin. grey transverse lines, and scattered all over with small oval white spots. The back and tail are thickly covered with transverse or circular rows of streaks. The tail is round, and considerably longer than the body, its outer extremity being pointed: The scales on the root of the tail are arranged in half circles, while those on the rest of it go quite round. The particular distinguishing character of the teguixin is formed by several blunt folds of the skin along both sides, from the head to the hind thighs, and by three transverse folds under the throat.

sides and under side of the throat being marked with several folds of the skin. Syft. Nat. ed. Gmel. 1. 1073. G. 122. sp. 34. Amoen. acad. 1. 128. Mus. ad. Frid. 1. 45. Seba, mus. 1. t. 98. f. 3 †.

† In the Systema Naturae, the 96th plate of Seba, fig. 1. is likewise quoted, owing to the same name being affixed; but the figure given there is that of the *tupinambis*.

ART. XLIV. *THE NILOTIC LIZARD* *.

THIS species inhabits the marshy places near the Nile in Egypt, and has considerable analogy with the scink. Its distinguishing character is the three-cornered pyramidal form of the outer end of the tail; and the middle of the back is marked by four rows of scales, differing in size and figure from the other scales on the body. The common people in Egypt have a very ridiculous opinion, that the eggs of crocodiles which are deposited in the water contain real crocodiles, while such as are layed on dry land only produce small lizards.

Nilotic
Lizard.

* Le Triangulaire. Encyclop. Method.

Lacerta Nilotica: Having a long tail, triangular at the tip; with a smooth body; the back being marked by four distinct rows of scales. Syst. Nat. ed. Gmel. 1. 1075. G. 122. sp. 37. Hasselquist, It. 311. n. 59.

ART.

ART. XLV. *THE DOTTED LIZARD* *.Dotted
Lizard.

A SPECIMEN of this lizard was sent from Ceylon to Seba, who says that the eggs are about the size of small peas. The body is thick and round, having two longitudinal dirty yellow lines on the back, between which there are six rows of blackish or dark brown dots, and six other rows on each side of this middle area, beyond the yellow lines. The tail is very long in proportion to the length of the body, and both it and the legs are interspersed with blackish dots.

* La Double-raie. *Encycl. Method.*

Lacerta interpunctata: Having a long round tail; the back being marked by two longitudinal yellow lines, interspersed with black dots. *Syst. Nat. ed. Gmel.* i. 1075. G. 122. sp. 38. *Mus. ad. Frid.* i. 46.—*Stellio punctatus*. *Laurent. amphib.* 58. n. 96. *Seba, mus.* ii. t. 2. f. 9.

ART.

ART. XLVI. *THE SPITTING LIZARD* *.

Spitting
Lizard.

THE following description of this species is taken from a specimen sent to M. d'Antic from St Domingo, which that naturalist kindly communicated to us; and is compared with the account given by Sparrman of several individuals from St Eustatius, sent to the museum of Baron de Geer, by M. Acrelius, who received them at Philadelphia from that island.

It is two inches long, of which the tail is one inch. The whole surface of the body is very smooth and shining, being destitute of transverse rows of scales on the belly. The ground colour is whitish on the under parts of the body, and grey, mixed with dark brown, on the upper. Several broad

* Le Cracheur.

Lacerta Sputator: Having a round tail, of a middle length; the head, body, and tail, being surrounded by broad blackish belts. Syst. Nat. ed. Gmel. 1. 1076. G. 122. sp. 72. Sparrmann, Nov. Act. Stockh. v. 2. n. t. 4. f. 1. 2. 3.

Spitting
Lizard.

broad belts of dark brown, almost black, surround the head, body, and tail: One of these goes round the back of the head, one round the neck, directly before the fore legs, two round the middle of the body, one directly behind the hind legs, at the root of the tail, and five more round the tail: A similarly coloured stripe surrounds the upper jaw. The external ears are either wanting altogether, or not apparent. The tongue is flat, broad, and slightly split at the tip. The top of the head and muzzle are whitish, spotted with black. The legs are variegated with grey, black, and white. The feet have each five toes, which are garnished underneath with scales, being terminated by small flat pellets, or scaly plates, without any apparent claws.

M. Acrelius informed the Baron de Geer, that this species inhabits the warm parts of America and its islands, being found mostly in the houses, climbing among the beams and other wood-work. It is named, in some of these districts, the *Wood-slave*. When not disturbed, it does no harm; but must
ever

ever be looked at with circumspection, as it is easily irritated. While running along the walls, if any person comes too near to look at it, it seems frightened; and, coming as near as possible to the person it considers as its enemy, it appears to look with great attention for a while, and then squirts out a black spittle to some distance. This liquor is so poisonous, that it inflames and swells any part of the body it happens to fall on. The inflammation is, however, readily cured by washing with rum, or any kind of spirits, especially when mixed with camphor, which is likewise the usual remedy against the sting of scorpions. When this little animal is angry, it may be observed collecting the venomous black spittle in the corners of its mouth, before squirting it out. From this singular property, Mr Sparrman has adopted the trivial name of the species, as here given, in Latin, French, and English. The same naturalist has caused engrave, in his plate in the Swedish Transactions, several small ash-coloured eggs, spotted with brown and black, that were contained

Spitting
Lizard.

tained in the same bottle with this lizard in Baron de Geers collection.

Along with this lizard, another specimen from St Domingo was sent to M. d'Antic; and similar specimens were contained in the same bottle with the spitting lizard in Baron de Geers collection: These we consider as only a variety of the spitting lizard, perhaps differing in sex. This other lizard is of the same size and form, and only differs in colours; its upper parts being of a tolerably uniform deepish grey, variegated with very small longitudinal streaks of blackish brown, and the under parts of the body being dirty grey, mixed with flesh colour. In the specimen of this variety described by Sparrman, the tip of the tail was destitute of scales; probably owing to some accident, as in M. d'Antics specimen the tail was wholly covered by scales.

ART. XLVII. *THE QUETZPALEO* *.

THE Abbe Nollin, Director of the Quetzpa-
leo.
 Royal Nurfery Garden, communicated to us a lizard from Brasil, there named Quatzpaleo, which is represented by Seba in the 97th † plate of his first volume, fig. 4. and is described by Laurenti, p. 52. n^o. 82. under the name of *Cordylus Brasiliensis*. It is, however, extremely different from the *cordylus*; neither having its back covered by large square scales, nor its belly furnished with transverse rows of scales. In its form and structure, it belongs to this fourth subdivision of the genus in our work, instead of the third, in which the *cordylus* is arranged. It has, however, considerable

VOL. II. F resemblance

* This seems the same with the variety β . of the *L'azurea*, in the *Systema Naturae*, Gmelins edition, p. 1061. G. 122. sp. 12.—T.

† The 91st plate is quoted for this individual in the *Syst. Nat.* and is made a distinct variety from the *Cord. brasiliensis* of Laurenti.—T.

Quetzpa-
leo.

resemblance to the cordylus, especially in the form of the tail.

The head is flattened on the top, and compressed at the sides ; having somewhat of a triangular form, and is covered by small scales. The teeth are tolerably close set, growing smaller towards the fore part of the mouth, and there are about thirty in each jaw. The scales on the back, and on the upper surface of the legs, are small ; and, being placed close together, give the skin a shagreen appearance. On the belly, and the under surface of the legs, the scales are rather larger, and are considerably hard. The inside of each hind thigh is furnished with a row of hollow tubercles, open at their extremities ; and other tubercles, considerably elevated, of different sizes, very hard, and much pointed, are scattered over the outer surface of the hind legs. Similar tubercles with these last, but not so much projecting, are found along the flanks, and on the fore legs near the feet. The tail is surrounded by very distinct rings of large scales, each of which has a very sharp point-
ed

ed ridge. This structure of the tail, which is similar to that of the cordylus, together with the particular arrangement of the scales on the body, are sufficient for distinguishing this lizard from all the other known species. The specimen sent by the Abbe Nollin, was rather above seventeen inches in its total length, of which the tail exceeded eight inches. The upper part of the body was grey, the under part whitish, and the tail very dark brown.

Quetzpa-
leo.

V. DIVISION.

OF LIZARDS,

Having large imbricated Scales on the under surface of the Toes.*



ART. XLVIII. THE GECKO †.

Gecko.

THIS is the first species that has occurred, in our Natural History of Oviparous Quadrupeds, which seems to contain
a

* This particular structure is represented in the figure of the gecko.

† Le Gecko, called Tokaie by the Siamese. Encyclop. Method.

Lacerta Gecko: Having a round tail, of moderate length; with lobated toes, having hardly any claws; the body being warty, and the ears very open. Syst. Nat. ed. Gmel. i. 1068. G. 122. sp. 21. Fork. faun. Arab. 13. n. 4. Amoen. acad. i. 133. 232. Mus. ad. frid. i. 46. Hasselquist, It. 306.

Gecko



1. & 2. Gecko. — 3. Hat-headed Lizard. *Archer Sculp.* p. 28.

a mortal poison. Hitherto we have only found Gecko.
 the powers and properties of animals augmented by Nature, for the purpose of increasing the number of living beings, or for counteracting the baneful effects of time and of the elements ; here, on the contrary, Nature seems to act against herself, by producing, in a species of lizard that is extremely prolific and numerous, a highly corrosive liquor, which induces putrefaction or destruction in every animal substance that it penetrates ; having implanted in this species the principles of death and destruction, instead of increasing the sources of life and reproduction.

This destructive species of lizard, whose dangerous properties require our attentive examination, has some resemblance to the chameleon. The head is large, in propor-

F 3 tion

Gecko perlatus.—Houttuyn, act. Vliessing. ix. 322.
 —Gecko teres. Laur. amph. 44. n. 57.—Salamandra.
 Gronov. Mus. ii. 78. n. 53.—Salamandra indica. Bont.
 Jav. 57. Job. Ludolphi, Hist. Æthiop. lib. 1. ch. 13.
 §. 5. Seba, Mus. 1. t. 108. f. 1. 3. 5. Petiv. pterogr. 1.
 n. 20. f. 1.

Gecko. tion to the body, and somewhat of a triangular shape ; having large eyes, and a flat tongue covered with small scales, the tip being notched. The teeth are sharp, and so extremely strong, according to Bontius, as to leave impressions on the hardest substances, even on steel. The whole of the body, head, and limbs, are almost entirely covered by small warty excrescences of different sizes. The insides of the hind thighs are furnished with a row of elevated hollow tubercles, similar to those already described on the guana and several other lizards. The feet are singularly constructed, the under surfaces of all the toes being covered by oval scales, more or less hollowed in the middle, which are each of the same breadth with the toe, and regularly overlap each other, like tiles or slates on a roof ; the sides of these toes are furnished with narrow membranes, which add to their breadth, but do not connect them together. Linnaeus has said that this species has no claws* ; but, in

* In the *Systema Naturae*, the gecko is described as having scarcely any claws, *subunguiculati*, not as destitute of claws altogether.—T.

in all the specimens in the Royal Collection, Gecko.
all the toes, except the outermost on each foot, have very short, sharp, and hooked claws; which circumstance agrees extremely well with the readiness in climbing, and the force with which it attaches itself to various bodies, that are observed in this animal.

Thus we find, that in lizards, as in other animals, particularly birds, the feet are very variously constructed: In some species the toes are altogether distinct and separate from each other; in others they are united by membranes, of various degrees of strength or extent; in others the toes, though not attached, are skirted by membranes; and, in others again, they are environed in a common covering, and divided into two bundles.

The tail of the gecko is usually somewhat longer than the body, but is sometimes shorter: It is round, slender, and covered by distinct rings of scales; each of these circular belts being composed of several rows of very small scales, the number

Gecko.

and arrangement of which are very various in the different specimens which we have examined: Owing to this circumstance, different naturalists have disagreed from each other in their account of this species, by counting too scrupulously the number of these rings, and of the small scales that compose them, in different individuals.

According to Bontius, the general colour of this species is bright green, spotted with very brilliant red; and the same naturalist asserts, that the name gecko is in imitation of the cry which it always emits before rain. It is found in Egypt and India, in Amboina, the other Molucca islands, and other hot countries, keeping mostly in the hollows of rotten trees, and in damp places. It even sometimes comes into houses, where it excites so great dread, on account of its venomous properties, that the inhabitants use every exertion to destroy it as soon as possible. Bontius relates, that its bite becomes certainly mortal in a few hours, unless the part bitten be burnt or cut out immediately. Even the contact of its feet is attend-

attended with great danger, and, according to the report of voyagers, renders poisonous such articles of food as it happens to tread upon. Bontius supposes this effect to be produced by its urine; but it is more probable that it arises from the liquor which oozes out of the hollow tubercles on the inside of the thighs. The blood of the gecko, and its saliva, or more properly a kind of thick and frothy yellow liquor, which distils from its mouth, when irritated, or when it suffers any violent emotion, are considered as mortal poisons; and both Bontius and Valentin inform us, that the inhabitants of Java employ these liquors to poison the points of their arrows. Hasselquist asserts, that the toes likewise of this terrible lizard give out a poisonous liquid, and that it is very apt to run over any substance that is impregnated with sea salt, on which it leaves a very dangerous poison. He saw three women at Cairo, who had very nearly lost their lives, from having eaten some cheese lately salted, on which a gecko had deposited its poison. He was
 farther

Gecko.

farther convinced of the corrosive nature of the fluid which ouzes from the feet of this animal, by having seen the hand of a person over which a gecko had run, when attempting to catch it ; every part that had been touched by the feet of the lizard, was covered with small hot fiery pimples, like those produced by nettles. These facts confirm the testimony of Bontius ; so that it appears incontestibly proved, that the gecko, in the hot countries of Egypt and India, contains a dangerous poison, which sometimes produces mortal effects : Hence, it is not at all surprising that people should see it with horror, and either fly from, or use every exertion to destroy, so noxious an animal. It is probable, however, that these deleterious qualities may be modified in their degrees, by different circumstances in the seasons of the year, the climate, food, &c. in different individuals of the species. Bontius relates, that the Indians consider the root of turmeric as an antidote against the bite of a gecko.

Accord-

According to Bontius, the voice of the gecko resembles somewhat the croaking of a frog, and is very easily heard in the night. It is very fortunate that so dangerous an animal is not silent, like several other oviparous quadrupeds, as its cry gives warning of its approach, and enables people to avoid, or guard against, the danger. It generally quits its retreat after rain, going about with a rather slow pace, in search of worms and ants. The eggs of the gecko are represented by Seba, in the same plate with the figure of the animal itself: These the female carefully covers over with a little earth, leaving them to be hatched by the heat of the sun. Wurfbainius, in his Salamandrologia, mistakenly reports that the gecko lays no eggs.

The Jesuit mathematicians, whom Louis XIV. sent to India, have given the figure and description of a lizard which they found in Siam, named *Tokaie*, which is evidently the same animal with the gecko. The individual examined by them measured twelve inches and a half from the point
of

Gecko. 7

Gecko.

of the muzzle to the tip of the tail. It is named tokaie by the Siamese, in imitation of its cry ; which proves that the voice of this species consists of two sounds harshly uttered, which are difficultly imitated by the human organs, and which some have endeavoured to render by the syllables to-kaie, and others by gecko *.

ART. XLIX. THE GECKOTTE †.

Geckotte.

WE have chosen to describe under this name, a lizard which resembles the gecko very much, so that it is very easy to con-

* See Mem. for a Nat. Hist. of Anim. vol. iii. article Tokaie.

† Le Geckotte. Encyclop. Method.

Lacerta mauritanica : Having a short tail, surrounded at the root by rings of pointed scales, the outer end being smooth ; the upper part of the body being prickly ; the toes being lamellated underneath, and destitute of claws. Syst. Nat. ed. Gmel. i. 1061. g. 122. sp. 11.—*Gecko muricatus*. Laurent. amphib. 44. n. 58.

Var.

confound the two with each other; and even naturalists have not hitherto given any true characters of distinction between them. Linnaeus only says, that both have the same form and the same general manners; but that the present species has a verticillated tail, while that of the gecko wants the circular rows of scales. This difference is only true while the gecko is young; for its tail is even less distinctly annulated after it is full grown than that of the gecko. The feet of these two lizards are likewise very similar; the toes of the geckotte being edged by narrow membranes, that do not connect them together, but which enlarge their surfaces: They are likewise covered on their under surfaces by similar large oval scales, which lap over each other.

After a very minute investigation of a great many specimens, both of the gecko and geckotte, from different countries, which

Var. β *Gecko verticillatus*. Laur. amphib. 44. n. 56. Seba, Mus. i. t. 108. f. 2. 7.

Var. γ *Gecko aculeatus*. Houttuyn, Act. Vliissing. ix. 324. n. 3. Seba, Mus. i. t. 108. f. 6.

Geckotte. which are preserved in the Royal Cabinet, we have observed these two species to differ from each other by three constant and very obvious characters. The body of the geckotte is shorter and thicker than that of the gecko; the geckotte is destitute of the particular rows of hollow tubercles on the inside of the thighs, which have been described in the gecko and many other species of the genus; and, lastly, the tail of the geckotte is shorter and thicker in proportion than that of the gecko. While young, the tail of the geckotte is covered by scales, that are all armed by prickly tubercles, and which are ranged in such a manner as to resemble circular rings; but as the animal grows older, the rings nearest the tip of the tail disappear; this obliteration gradually extends towards the root, till at last only a few remain, close to the origin of the tail, and these are at last obliterated as well as the rest; so that, when the geckotte has attained its full size, the tail is only covered by very small scales, without the least verticillated appearance. At this period

period the tail is considerably thicker and shorter in proportion than during the youth of the animal. This is the only species in which that singular change in the structure of the tail has been hitherto observed. These pointed tubercles are found on other parts of the geckotte, particularly on the legs, the head, neck, back, and sides; they are round, projecting, and sharp pointed, being surrounded at their bases by other smaller tubercles, in the form of roses. Geckotte.

As the geckotte inhabits almost the same countries with the gecko, they cannot be considered as varieties of the same species, produced by the influence of different climates. The geckotte is found in Amboyna, India, and Barbary, from which last country it was sent by M. Brander to Linnaeus. There is a small specimen in the Royal Cabinet, marked by the name of St. Domingo lizard, which is distinctly a geckotte; so that in all probability this species may likewise inhabit the western world.

M. Olivier has informed us, that the geckotte is very common in the southern parts
of

Geckotte.

of Provence, where it is called *tarente*; a name which we have formerly mentioned as applied in some places to the starry lizard, and to a variety of the green lizard. It is there found among the ruins of old buildings, avoiding cool, low, or damp situations, and generally keeping about the roofs. It prefers a warm exposure, and basks much in the rays of the sun. During winter, it retires under the cover of the tiles, or into chinks of the walls, but without undergoing any perfect hybernation or torpor; for, when uncovered, it immediately endeavours to escape, with a slow pace. It quits these retreats in the early part of spring, to warm itself in the sun beams, but never goes far from its hole, into which it retires on the smallest alarm. In the warmest season of the year it moves about very quickly, but without the amazing agility of some lizards. It feeds chiefly on insects. It climbs readily, by means of its hooked claws, and the scales which cover the under surfaces of the toes, being able to run about very nimbly on the walls, and even under

under the beams of houses. M. Olivier, from whom the foregoing account of this species was received, has often seen them fixed on the under side of the vault in a church.

Geckotte.

Thus the geckotte resembles the gecko both in its manners and appearance. It has likewise been considered as venomous, probably on account of its resemblance to that other species, which, according to the accounts of a great number of voyagers, emits a mortal poison ; but M. Olivier declares, that he never could receive any proof of this fact, and that it always endeavours to escape, when seized, without making any attempts to bite. The geckotte always keeps in its hole before rain ; but it never emits any cry on these occasions, like the gecko : And M. Olivier, who has often caught it with pincers, assures us that he never heard from it the smallest sound on any occasion.

ART. L. *THE FLAT-HEADED LIZARD* *.Flat-head-
ed Lizard.

THIS lizard has not hitherto fallen under the observation of any naturalist, but appears to have been mentioned by some travellers, as shall be noticed in the course of this article. Few of the class of oviparous quadrupeds are equally remarkable, in the singularities of their structure, with this, which seems to form a connecting link with several other lizards, particularly the chameleon, gecko, and water newt or ask, having some of the principal characters of all these three species. In the form of its head and body, and the appearance of its skin, it resembles the chameleon; its feet resemble those of the gecko; and its tail is similar to that of the ask. Besides these, it has other well marked characters, which are peculiar to itself; so that no species of the genus can possibly be

* La Tête-plate.

OVIPAROUS QUADRUPEDS. 99

be more readily recognised, or more distinctly characterised than this.

Flat-headed Lizard.

The head is very much flattened, particularly its under surface, which is entirely flat, from which form the trivial name here employed has been derived. The opening of the mouth is extremely large, extending beyond the eyes, and having a great number of very small teeth. The tongue is flat and notched at the end, having considerable resemblance to that of the gecko. The under jaw is so extremely thin, as to give an appearance, at first sight, that the animal had lost this part of its head altogether. The head, in its general form, is triangular, like that of the chameleon; but the triangle is considerably more lengthened, and has neither the crest nor indentations that have already been described in the article appropriated to that species. The head is joined to the body in such a manner as to form an obtuse angle underneath, while most other oviparous quadrupeds have their heads projected in the same line with the body. The head, likewise, is very large in propor-

Flat-head-
ed Lizard.

tion, being nearly one half of the length of the body. The eyes are very large and prominent, having a very distinctly visible iris, with a perpendicular narrow pupil, possessed of great contractility. The muzzle is blunt, forming the apex of the triangle of the head, and has the nostrils placed almost at its tip. The openings of the ears, which are very small, are situated immediately behind the corners of the mouth, at the two other angles of the triangle of the head. The skin on the under side of the neck is formed into a plait or fold. The under surface of the body is entirely flat.

All the feet of this lizard have five toes, which are connected together at the roots by the skin of the legs, which covers them completely on both surfaces; but they are afterwards very completely separated from each other, especially on the hind-feet, the inner toe on which is at some distance from the rest, forming a kind of thumb, as in many other lizards. Towards their extremities, all the toes are skirted on each side
by

by membranes, as in the gecko and gecko-
te which enlarge their surfaces, and their
under surfaces are covered by imbricated
scales, lapping over each other like tiles :
There are usually twenty of these scales in
two rows, which are a little separated at the
tip of the toes, allowing room for a very
strong hooked claw, which folds down-
wards.

Flat head-
ed Lizard.

The tail is slender, and considerably
shorter than the body, appearing very broad
and much flattened, in consequence of be-
ing skirted by a broad thin membrane at
each side, giving it some resemblance to a
kind of oar. The real tail, however, is
very readily distinguishable from this mem-
brane, which covers it, and extends on each
side, as it forms a projecting ridge both a-
bove and below. This membranous ex-
pansion of the tail is placed quite different-
ly from that of the ask, being horizontal in
the present species, while in that other li-
zard, which will be afterwards described, it
is situated vertically.

Flat-head-
ed Lizard.

The skin on the head, body, feet, and tail, both above and below, is covered all over with innumerable minute projecting points, placed close to each other, which give it the appearance of fine shagreen. The most remarkable character of this lizard, which distinguishes it from all others, is, that the upper and under parts of its whole body, from the tip of the muzzle to the origin of the tail, and down both sides of all the legs, are divided from each other by an elongated fold of the skin, in form of a fringed membrane.

This lizard has only been found hitherto in Africa: It is probably very common in Madagascar, as there are four specimens from that island in the Royal Cabinet. The same collection has a fifth specimen, which was brought by M. Adamson from Senegal. From these four specimens, which exactly agree in form and structure, the description in this article was drawn up. No naturalist has as yet given any account of this species; but it has been observed in Madagascar, by M. Bruyères, of the Royal Society

ciety at Montpellier, who has kindly communicated his observations on the subject, for our assistance.

Flat-head-
ed Lizard.

The colour of this species is not constantly the same, but varies in different individuals, and in the same individual at different times, being subject to change, according to circumstances, like that of the chameleon, and some other lizards, so as to show often at the same time various shades of red, yellow, green, and blue. These changes have been observed by M. Bruyères, and seem to depend on different states of the animal, in the same manner as in the chameleon; and this opinion seems confirmed, by the skin of this species being almost exactly similar to that of the chameleon. In the chameleon, however, these changes of colour extend to the skin of the belly; while, in the flat-headed lizard, that part of the body is always of an uniform and brilliant yellow.

M. Bruyères believes, and apparently very justly, that the species we here name the flat-headed lizard, is the same with that

Flat-headed
Lizard.

mentioned by Flaccourt, under the name of Famocantrata, which was seen by that writer in the island of Madagascar*, and which is called Famocantraton by Drapper in his Description of Africa. The Madecasses, or natives of Madagascar, hold this animal in great detestation: Whenever they see one, they turn from it with horror, and, shutting their eyes, run away as fast as possible. Flaccourt says that it is extremely dangerous; that it flies at the negroes, and fastens on their breast so strongly, by means of the fringed membrane along each side of its body, that it can only be separated by means of a razor. The name Famocantrata signifies, *What leaps on the breast*. M. Bruyères assures us, that he has never seen nor heard of this singular circumstance. He adds, that this species is not in the least venomous, as he has frequently handled them, and they often took hold of his fingers with their mouths, without

* Flaccourt, History of Madagascar, chap. xxxviii. p. 155. See likewise Bomares Dict. of Nat. Hist. article Famocantraton.

out doing him the smallest harm. He is led to believe, that the dread which the negroes entertain for this animal, proceeds from its never turning away at their approach, but always running straight forwards, with its mouth wide open, in spite of every noise that is made with a view to frighten it. From this circumstance, the French mariners give it the name of *Le Sourd*, or the Deaf Lizard; which is likewise applied in some parts of France to the salamander.

Flat-headed
Lizard.

This lizard lives chiefly in trees, like the chameleon; keeping mostly concealed in holes during the day, and only going abroad in the night-time, or in rainy weather. It is then observed on the branches, leaping with great agility from one branch to another; in which exercise it is greatly assisted by its tail, which, though short, it is able to wrap round the small branches, to keep itself from falling. If it happens to fall on the ground, it is no longer able to leap, or to run with any swiftness, but crawls to the nearest tree, which it climbs

Flat-headed
Lizard.

up, and then begins to leap about as before. When on the ground it walks with great difficulty; for, besides the shortness of its fore legs, as in other lizards, the singular manner in which the head is united with the body, as already described, causes its nose to strike against the ground at every step; but this conformation gives no difficulty to its motions, when among the branches of trees. It lives entirely on insects, and keeps its large mouth almost continually open to catch them, its inside being smeared over with a viscid liquid, which prevents insects from escaping.

Seba, in the 103d plate of his second volume, fig. 2. has given the figure of a lizard, which he says is rarely found in Egypt and Arabia, that seems to have some connection with our flat-headed species; but, if his figure and description are accurate, they are two distinct species, as may readily be observed by comparing our description and engraving with those of that naturalist. The lizard of Seba has its toes edged with membranes, like that which we
have

have described ; and the sides of its tail are likewise edged in the same manner : But its head is not flat, like that of our lizard ; neither are its sides furnished with the fringed membrane which we have described. The hind feet, in that species, are almost perfectly webbed ; and the tail is round, and much longer than the body, the membranes at its sides being deeply indented or fringed.

Flat-head-
ed Lizard,

VI. DIVI-

VI. DIVISION.

OF LIZARDS,

Having only three or four Toes on the Feet.

ART. LI. THE SEPS*.

Seps.

THIS animal requires to be considered very closely, to enable us to distinguish it from a serpent. That class of animals

* Le seps. Encycl. Method.—Called Cicigna, in Sardinia.

Lacerta Seps: Having a longish tail surrounded by rings of scales; the whole body being covered by quadrangular scales, and having a future or stripe along each side. Syft. Nat. ed. Gmel. i. 1071. G. 122. sp. 17. Amoen. acad. i. 293.

Gmelin adds the two following, as varieties, but with an expression of doubt, whether they should be considered as belonging to this species.

Var.



1. Seps. - 2. Chalcides, p. 119.

Archer Sculp.

mals is chiefly distinguishable from lizards, Seps.
 by having no legs or external openings to the organs of hearing ; and in the seps the opening of the ears are perceived with difficulty, and the legs are so small as to be hardly visible. At first sight, one would be apt to consider the seps as a real serpent, which, by some *lusus naturæ*, had acquired two minute feet close behind the head, and two others at a greater distance backwards, at the root of the tail. The resemblance is so much the stronger, that this animal has a very long slender body, which it frequently rolls up, in the same manner with serpents*. Unless very narrowly inspected, one would be inclined to consider the legs and feet as being only shapeless appendages. Thus the seps forms a shade or
 link

Var. β . *Seps variegatus* : Variegated with scarlet ; the head being varied with black and white. Laurent. amphib. 59. n. 100 ?

Var. γ . *Seps marmoratus* : Of a blackish blue colour ; having irregular white stripes, intermixed with round white spots. Laurent. amphib. 59. n. 101 ?

* Natural History of Sardinia, by F. Cetti.

Seps.

link of connection between the lizard tribe and that of the serpents. Its ambiguous form and character serve as very distinct marks for distinguishing it from other species of this genus. The eyes are very small; and the openings of the ears are much less obvious than in most lizards. The tail is commonly short, but is sometimes as long as the body, ending in a very sharp point. The whole body is covered by quadrangular scales, generally in eight rows, which form a number of streaks, both longitudinal and transverse. The colour is generally paler on the belly than the back, and along the upper part of each side a pale stripe extends from behind the head almost to the end of the tail, bordered above and below by a very narrow stripe of black.

The size of this species, like that of other lizards, varies according to climate, food, and tranquility. Hence most naturalists have very properly avoided giving any fixed magnitude, as a character of distinction for the different species of animals:

But

OVIPAROUS QUADRUPEDS. 111

But it is extremely proper to point out the limits of size in animals, where that can be done ; and particularly, if possible, to ascertain the connection between this and different circumstance of climate, soil, habits, &c. by which the size is influenced. In Provence, and the other southern provinces of France, this species seldom exceeds five or six inches in length ; but, in other countries more congenial to its nature, it sometimes grows to twelve or even fifteen inches. One specimen in the Royal Cabinet measures nine inches and three quarters, from one extremity to the other, and is one inch and a half in circumference at the thickest part of the body ; the feet are only one sixth of an inch long, and the tail is three inches and a quarter. The individual described by Cetti, measured twelve Sardinian inches and a quarter in total length.

The legs of the seps are so extremely short as only to measure two lines, or the sixth part of an inch, when the body is twelve inches in length. They seem hardly

ly

Seps.

ly capable of reaching the ground, and yet the animal uses them very readily in walking. Each of these feet have three minute toes, which are hardly visible, but are all furnished with claws, as in most other lizards. Linnaeus counted five, or at least four and some appearance of a fifth, in the specimen he examined in the collection of Prince Adolphus; but in several specimens of the Royal Cabinet, from different countries, we could never find more than three, even with the assistance of strong magnifiers.

The lizard which Ray enumerates, under the name of seps, or *lacerta chalcidica*, has been erroneously considered by Linnaeus as synonymous with the chalcides, as will be seen in the following article. It ought to be referred to the present species, with which the description of Ray agrees extremely well. That, likewise, which is described by Columna, under the name of seps, chalcides, or *lacerta chalcidica*, and which Linnaeus has referred to the chalcides, is only a variety of the seps, very
much

much resembling that animal, as found in the neighbourhood of Rome and in Provence: *Columnas* specimen, indeed, measured two feet long, while the Roman *seps*, of which there is a specimen in the Royal Cabinet, does not exceed seven inches and two thirds. The animal which Linnaeus mentions under the name of *anguis quadrupeds*, is likewise a real *seps*, all the characters which that great naturalist attributes to it, belonging to our present species; except, indeed, that he declares it has no openings to the ears, and that its feet have five toes. The opening of the ears, however, are so minute, that they might very readily be overlooked, especially in a specimen only five inches and a half long; and as Linnaeus acknowledges the toes were so small as to be scarcely visible, a mistake as to their number is not at all surprising. The *lacerta anguina* of Linnaeus, or serpent-like African worm of Seba *, is likewise a real *seps*; as will readily

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* *Vermis serpentiformis ex Africa.* Seba, mus. ii. t. 68. f. 7. 8.

Seps.

appear by inspecting the engraving in Sebas work, which is quoted by the great Swedish Naturalist. The form of the head and body, the disposition of the scales, and the position and shortness of the legs, all agree exactly with the seps; and it is only from inattention that its feet have been supposed not divided into toes, on which account Linnaeus considered it necessary to arrange the individual described by Seba as a separate species. According to Seba, the ancient Greeks were acquainted with this animal, and even thought themselves informed of its habits in certain countries, as they indicate, by the names *Αχνηλοι* and *Ηλυοι*, its residence in troubled and muddy waters. The animal described by Seba is found at the Cape of Good Hope, near Table bay, among the rocks on the banks of the river. According to Sebas figure, the seps of the Cape has its tail considerably longer than the body.

On dissecting a female seps, Columna found fifteen living foetuses; of which some were already out of the membranes, while

while the others were still wrapped up in a transparent pellicle, and within the eggs, like the young of the viper. We shall observe a similar circumstance in the natural history of the salamander; so that not only do the different species of lizards present certain analogies, but the whole order of oviparous quadrupeds are variously connected, by different links, with serpents, cartilaginous fishes, and other fishes of different genera, in which the young are hatched from the eggs within the body of the mother.

Several naturalists have considered the seps as a species of salamander; and, as the salamander is believed by many to be venomous, the seps has been thought so likewise. It was even believed by the ancients to be a noxious animal; and the name *Seps*, which they applied to this species, to the chalcides, to very venomous serpents, centipeds, and other dangerous reptiles, which is derived from *σῆψω*, *corrumpo*, may be considered as a general expression for most poisonous animals. It is likewise pro-

Seps.

bable that the ancients, and many of the modern naturalists after them, have very often confounded the seps and chalcides under the generic term of seps, and even sometimes under the particular name of chalcides*.

From the observations of M. Sauvage, it would appear that the seps is not in the least venomous in the southern parts of France, and that its bite is never followed by any disagreeable consequences. That naturalist relates, that he has seen a seps swallowed by a fowl, without producing the smallest inconvenience. He adds, that the fowl having swallowed a small living seps, head foremost, the lizard made its escape immediately after by the anus, as earth-worms often crawl from the guts of ducks: The fowl snatched it up a second time, but with the same bad success as at first; however, on a third attempt, the seps, being bit through the middle, remained in the stomach of its enemy. From the facility

* See Gesner, Hist. Anim. lib. ii, De Quadrup. Ovip. fol. 1.

lity with which the seps, in this instance, glided through the bowels of the fowl, M. Sauvage proposes it as a more effectual remedy, in certain disorders, than the usual prescriptions of lead and mercury*. M. Cetti says likewise, that he never heard of any accident in Sardinia occasioned by the bite of a seps, and that it is universally considered as a harmless animal in that island; only it is believed, that when cattle or horses happen to swallow one among their grass, they swell, and are in danger of dying, unless a drench of oil, vinegar, and sulphur, be immediately administered.

The seps seems to dread the effects of cold even more than the land tortoise and most other oviparous quadrupeds, as it conceals itself earlier in the earth at the approach of winter. In Sardinia, it disappears at the beginning of October, and is only found in holes below ground after that period: It leaves its retreat in spring,

H 3

frequenting

* Memoir on the Nature of Venomous Animals, which gained the prize from the Academy of Rouen in 1754.

Seps.

frequenting places covered with grafs; and remains in these situations all summer, even when the grafs is quite burnt up.

M. Thunberg, in the Memoirs of the Academy of Stockholm *, under the name of *Lacerta abdominalis*, has given the description of a lizard that is found in Java and Amboina, which has great resemblance to the seps; from which it only differs in the tail being proportionally much shorter, and in the number of its toes. But as Thunberg does not appear to have seen that animal alive, and as he mentions that the extremity of the tail was naked and without scales, we may readily conceive that his specimen had lost part of its tail by some accident. Besides, we have already seen that the tail of the seps is subject to considerable variation in its length. He likewise acknowledges, that it was extremely difficult to distinguish the toes of his specimen with the naked eye: Hence it may have been so far injured in drying as to give the appearance of five toes, when in reality

* April quarter for the year 1787.

reality it may only have three, as in the Seps.
 seps; in which case it will fall to be considered as belonging to this species. If, however, the abdominal lizard has really five toes, it must be placed as a distinct species from the seps, and even in a different subdivision of the genus; perhaps it ought then to follow the spitting lizard, in our fourth division. But no one can be better qualified for throwing light on this part of natural history than M. Thunberg, to whom we shall refer it for farther elucidation.

ART. LII. *THE CHALCIDES* *.

Chalcides.
THE seps is not the only animal which forms a connecting link between lizards and serpents, by the length and slenderness of its body, and the distance and
H 4
minuteness

* *Lacerta Chalcides*: Having a long round tail, and extremely small five-toed feet. *Syst. Nat. ed. Gmel.* 1. 1078. G. 122. sp. 41.

The other synonyms, quoted in the *Systema Naturae*, are not given here, on account of the criticisms on that excellent work which are contained in this and the preceding articles.—T.

Chalcides. minuteness of its almost invisible legs. The chalcides is equally remarkable by the smallness and position of its legs, and by the great length of its body. Linnaeus and several other naturalists, as well as ourselves, have considered the seps and chalcides as distinct species, and have endeavoured to characterise them, by saying that in the seps the tail is verticillated, while in the chalcides it is round and longer than the body. Whatever sense may be affixed to the term verticillated, it can never be intended as a vague and unobvious character. Besides, we have already had occasion to observe, that the tails of lizards are subject to great variety in regard to their length, even in the same species; and, consequently, that no proper distinguishing character ought ever to be founded on such circumstances, unless they are very considerable. From these considerations, we have been led to suspect, that the lizard named chalcides by Linnaeus may only be a variety of the seps, several individuals of which species have the tail almost as long as the body. We have been

been farther confirmed in this opinion, because it appears that Linnaeus had never seen the lizard which he calls the chalcides. Having examined the different authors quoted by Linnaeus under that article, and having compared Aldrovandus, Columna, Gronovius, Ray, and Imperati, we have observed, that all the descriptions given by these authors, and all their observations on the natural history of the animal under consideration, may be referred to the real seps *. From these considerations, we might be led to conclude, that the seps and chalcides formed only one species: But there is a lizard in the Royal Collection, which resembles the seps, in the length of its body, the smallness of its legs, and the number of its toes, and which is, notwithstanding, essentially and specifically different from

* *Scincus*, cauda truncoque longissimis cylindraccis, &c. Gronov. zooph. 43.—*Caecilia major*. Imperat. nat. 97.—Seps, f. *Lacerta chalcidica*. Ray, synopf. quadr. 272.—Seps, Chalcides, f. *Lacerta chalcidica*. Columna, Ecphra, 1. 35. t. 36.—*Lacerta chalcidica*. Aldrov. quadr. digit. ovip. lib. 1. fol. 638.—*Chalcides tridactyla*, Columnae. Laurent. amphib. 65. n. 114.

Chalcides. from the seps, as we shall show in this article. This lizard seems not to have been known to any of the modern naturalists who have written concerning the chalcides, and may therefore be considered as a new species, to which we have chosen to affix the name of chalcides, which has been applied, by Linnaeus and others, only to a variety of the seps.

The chalcides, which we mean to describe in this article, differs from the seps in a very essential character, which renders the two species easily distinguishable from each other. In the seps the whole body and tail are covered by small imbricated scales, covering each other alternately, like tiles on a roof; whereas, in the chalcides, the scales on the body and tail are ranged in very distinct circular bands or rings, that are separated from each other by a kind of wrinkles. The body of the individual in the Royal Cabinet is two inches and a half long, and is surrounded by forty-eight rings. The tail is a good deal longer than the body, is surrounded by a considerably greater number

number of similar rings, and tapers gradually to a point. The head of this species has considerable resemblance to that of the seps, but has no perceptible openings to the ears; in which circumstance it approaches still nearer to the serpents than the former species. The legs are even shorter than those of the seps in proportion to the body, being only one line in length, and the fore legs are situated very near the head, each foot having only three toes. The general colour of the individual in the Royal Collection is dull brown, which may possibly be occasioned by the spirits in which it is preserved; but it approaches in some degree to the colour of brass, which has been indicated by the Greeks in the name *χαλκίς*, from *χαλκος* *aes*, which they have given to some kind of lizard, probably the species now described.

Chalcides.

We are not acquainted with the native country of this lizard, but in all probability it belongs to some of the hotter regions. In the structure of its scales, and their arrangement in rings or circular belts, the

chalcides

Chalcides. chalcides has considerable affinity with that genus of serpents which Linnaeus denominates *Anguis*, and with several species of worms; particularly with a two-footed reptile, which shall be described in this work, immediately after the oviparous quadrupeds, and which unites the order of lizards with that of serpents still more nearly than either the seps or the chalcides.

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Flying Lizard.

Archer Sculp.

VII. DIVISION.

OF LIZARDS,

Having membranous Wings.

ART. LIII. THE FLYING LIZARD*.

IF the two species of lizards which have been last described, are in some degree intermediate between oviparous quadrupeds and serpents, or true reptiles, the species which forms the subject of this article, unites them with animals of more perfect organization, particularly with birds, by means of a kind of wings with which it is furnished.

Flying
Lizard.

The

* Le Dragon. Encyclop. Method.

Flying
Lizard.

The name of dragon *, which has generally been applied to this animal, always raises very extraordinary ideas, by recalling to memory, all the wonderful relations which have been read or heard concerning that famous monster. The imagination becomes heated, by recollection of all the grand imagery which it has afforded to the genius of poetry : A kind of mystic terror invades the timid mind on this subject, which awakens the curiosity of every one.

* In the original of this work, a species of lizard already described is named the dragonne; which is scarcely enough distinguishable from dragon, the French name of the present species : Having, perhaps improperly, employed the name dragon for the former lizard, the *L. Dracunculus* of Linnaeus, it becomes necessary to apply a very different name to this animal.—T.

Draco volans : Having membranous wings not attached to the fore legs. Syft. Nat. ed. Gmel. i. 1056. G. 121. sp. 1. Mus. ad. frid. 1. 40. Gronov. mus. ii. 73. n. 46. Amoen. acad. 1. 126.

Lacerta africana volans, f. *Draco volans*. Seba, mus. ii. t. 86. f. 3.—*L. volans indica*. Ray, synopf. quadr. 275.—*L. volans*. Brädl. Nat. t. 9. f. 5. Grimm, Eph. Nat. Cur. XII.—*Dracunculus*, f. *Lacertus volans*. Bont. Jav. t. 57.—*Draco major*. Laurent. amphib. n. 76.

one. The dragon has been a common topic both in ancient and modern times. Consecrated by the religion of the earliest nations, it became part of their mythology, being considered as the minister of the gods, the guardian of their treasures, and the chosen servant of their love and of their hate : It has been believed subject to the power of enchanter's ; as the vanquished enemy of the demi-gods ; and has even become part of the sacred allegories of holy writ. This wonderful creature of fancy has been celebrated by the earliest poets, in all the luxuriant colours which genius could invent. Having become a principle ornament of the more recent pious fables, the dragon has been conquered repeatedly by the heroes and heroines of the Christian church militant, which fought, amid the ensanguined field of holy war, to establish and extend the law of the prince of peace. In still later times, it has been adopted into a new mythology, which established the fairies and necromancers on the vacant thrones of the ancient enchantresses ; and, having become

Flying
Lizard.

Flying
Lizard.

become an emblem of the valiant deeds of knight-errantry, it has equally embellished the modern as the ancient poetry. Though proscribed by the severe laws of historic truth, yet universally celebrated in the pleasing strains of fiction, it has been continually described under an almost infinite variety of forms : Always represented as endowed with invincible force ; as destroying its enemies merely by the power of its eyes ; as cleaving the air with the rapidity of lightning, and darting on its prey with the fury of thunder ; as illuminating the darkness of the night, or the obscurity of the deepest caverns, by the fire of its eyes ; as joining the swiftness of the eagle, with the strength of the lion, and with the size of the largest serpents * ; as sometimes assuming the human figure, and as endowed with almost divine intelligence : Such, entirely out of nature, the dragon has been always imagined, in almost every part of the earth, and is even worshipped in these days in some of the great eastern empires. In spite of

* Some of these exceed forty feet in length.

of the absurdity of these opinions, this fabulous being shall perpetually survive in the wonderful productions of genius, fertile in embellishments, and shall long continue to supply a bold imagery to the enchantments of poetry ; delighting, by the recital of its marvellous power, the imaginations of those who require, sometimes at least, to be transported into the regions of fable, and to contemplate truth enveloped in the splendid ornaments of fiction.

Flying
Lizard.

Instead of this airy being, the dragon of nature, which we shall here describe under the name of flying lizard, is a small weak animal, perfectly innocent and peaceful in its dispositions. Having hardly any weapons, either of offence or defence, it transports itself, by means of a particular structure, from place to place with agility, flitting from one branch to another in the forests which it inhabits. The membranous expansions, resembling wings, with which it is provided, and which in some measure serve the purpose of flight, together with the lizard form, and certain analogies which

Flying
Lizard.

it possesses with the serpent tribe, have contributed to produce some distant likeness between this little oviparous quadruped and the imaginary monster of poetic creation.

The wings of the flying lizard are extended by six cartilaginous rays on each side, which spring horizontally from the back bone a little behind the fore legs: These rays are somewhat curved backwards, and support the membranous wings, each of which is attached at its fore edge to the foremost of these rays, and extends backwards, including all the other rays, in a somewhat rounded form, to the origin of the hind legs. Each wing is somewhat triangular, the base of the triangle extending along the back bone; and the distance from the apex, or outer point, of one wing to that of the other, is nearly equal to that between the hind and the fore legs of the animal. This membrane is covered by scales, similar to those on the body; which is only to be seen under the wings, nothing more than the ridge of the back being perceptible above them. The structure of these wings

wings is very similar to that of the fins of fishes; particularly of the different species that are enabled, by the length and mobility of their fins, to raise themselves out of the water by a kind of flight. They have no analogy with the wings of the bat, which consist of membranes interposed between the excessively lengthened toes of the fore feet; but have some resemblance to the membranes that are expanded between the fore and hind legs of the flying squirrel and flying maucauco, only that in these last there are no supporting rays. They differ still farther from the structure of the wings of certain birds, such as the penguin, which are useless for flight, and are called arms by some writers. Thus the flying lizard is placed in some measure, as a link of the great chain of being, between the viviparous quadrupeds and fishes; approaching, in some circumstances, to the nature of flying fishes; and in others to that of flying quadrupeds: And thus, in three separate classes, viviparous quadrupeds, oviparous quadrupeds, and fishes, we have spe-

Flying
Lizard.

Flying
Lizard.

cies that are connected in their analogies with a fourth class of the animal kingdom, that of birds.

The flying lizard is farther rendered remarkable, by three long pointed bags on the under part of the throat; which it can inflate at pleasure, so as to increase its magnitude and diminish its specific gravity, to assist it in flying about. This structure serves to compensate, in some degree, for the inferiority of its wings, when compared with those of birds; and is likewise analogous, at least in its use for facilitating flight, with the power which birds enjoy of diffusing the air, from their lungs, through many parts of their bodies. Setting aside these pouches and the wings, this animal is perfectly similar to most lizards. The mouth is large, and has a great number of sharp teeth. The back has three rows of projecting tubercles, the number of which is different in different individuals: The middle row is directly over the back bone, and each of the lateral rows is curved, with the convexity outwards.

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Lizard.

The legs are of considerable length, in proportion to the size of the body; and the toes, of which there are five on each foot, are long, separated, and armed with hooked claws. The tail is usually very slender, being twice the length of the body, and is covered by scales, each of which has a slight longitudinal ridge. This species seldom, if ever, exceeds twelve inches in total length: The largest specimen in the Royal Cabinet measures eight inches and two lines, - from the tip of the muzzle to the tip of the tail, which is four inches ten lines long. The colours are different; perhaps, in different countries; but are frequently composed of an agreeable mixture of black, brown, and whitish or pale blue, disposed in streaks or blotches.

The flying lizard lives peaceably among trees, flying about from branch to branch, and feeding on ants, flies, butterflies, and other insects. When flying from one tree to another, which it sometimes does to the distance of thirty paces, it makes a very audible noise with the flutter of its wings.

Flying
Lizard.

It inhabits different countries of Asia, Africa, and America. Le Barbinais, in his voyage round the world *, relates, ‘ That in a small island near Java, he saw lizards which flew about from tree to tree, like flying locusts. He killed one of these, and was quite astonished at the beauty and variety of its colours ; and was very anxious to preserve so rare and singular an animal, but the heat corrupted it before evening. It was about a foot long, having four legs, like those of common lizards. The head was flat, having an opening in the middle, through which a needle might have been passed. The wings were extremely thin, resembling those of a flying fish. The neck was surrounded by a kind of ruff, somewhat resembling the wattles on the throat of a cock.’

Though the toes of this species are long and perfectly separated, it is by no means confined

* Hist. Generale des Voyages, in 12mo, Vol. xlv.

confined to the dry land or to the tops of trees, but enjoys a very extensive range, being able to walk readily on the ground, to climb nimbly on trees, to fly with agility from branch to branch, and from tree to tree, and even to swim swiftly in the water. The membranous wings, being of great extent in proportion to the size of its body, serve as very powerful fins to propel it through the water; and the dilatable pouches on the throat contribute greatly, when blown up with air, to sustain it in swimming, by rendering its body specifically lighter than the water. Thus, the ground, the forests, the air, and the water, are all equally within its range; so that its feeble prey can hardly ever be difficult to procure, and its own safety is most readily protected; for, if pursued on the ground, it can seek refuge on the tops of trees or at the bottom of the water, and even, from such enemies as are capable to follow it in these situations, can escape through the air.

Linnaeus has reckoned two species of

Flying
Lizard.

flying lizards; having placed in the first species those that are found in Asia and Africa, and in the other those that inhabit the New World*: He distinguishes the former, as not having the wings connected with the fore legs, while in the other the fore edge of each wing is joined on with the leg of the same side. This difference seems insufficient for establishing a specific difference, even if well authenticated; but it rests merely on the authority of Seba, whose figures are by no means always accurate. Linnaeus himself had never seen any specimen, in which the fore leg answered the purpose of the first ray to the wing, neither is any such to be found in the rich and numerous collections at Paris, nor does any other author of credit warrant the insertion of that second species: Accordingly, till farther observations ascertain that

* *Draco praepos*: Having the fore legs connected with the wings. *Syst. Nat.* ed. Gmel. i. 1056. G. 121. sp. 2. Seba, *Mus.* i. t. 102. f. 2.—Yet it is added in a note, that authors both describe and represent the wings of this species as separate from the legs.—T.

that such a distinction actually exists, we shall only enumerate one species; and in this we are supported by the very respectable authority of M. Dāubenton, in the article of oviparous quadrupeds of the Encyclopedie Methodique.

Flying
Lizard.

VIII. D I V I S I O N.

O F L I Z A R D S,

*Having three or four toes on each fore foot,
and four or five on each behind.*

ART. LIV. THE SALAMANDER*.

Salaman-
der.

IN proportion as the objects of human
curiosity are difficulty attained, man
seems so much the more inclined to ascribe
to

* La Salamandre terrestre.—Le Sourd. Encyclop.
Method.

Σαλαμάνδρα, in Greek—Salamandra, in Latin—Salamanguesa, Salamantegua, in Spanish—Samabras, Samabras, in Arabic—Blande, Pluvine, Laverne, Suisse, Sourd, Mirtil, Alebrenne, Arrassade, Mouron; in various parts of France—Salemander, in Flanders—Punter-Maal, in Germany.

Lacerta



Archer. Sculp^t

1. Salamander. - 2. Three-toed Lizard, pl. 9. - 3. Ringed Frog, p. 235.

to them wonderful properties, or at least to suppose those they actually possess increased far beyond the truth. The imagination seems to require being occasionally roused by wonders; and that faith may be exercised in all its extent, it scorns to submit to the laws of reason. Man seems to think that

Salamander.

Lacerta Salamandra: Having a shortish round tail; the body being porous, without scales, and variegated with black and yellow. Syst. Nat. ed. Gmel. i. 1068. G. 122. sp. 47. Amoen. acad. i. 131. Mus. ad frid. i. 45.

Salamandra. Matth. Dioscor. p. 274. Gesn. quadrup. 80.—Salamandra terrestris. Aldrov. quadr. 641. Ray, quadr. 273. Houttuyn, act. Vliessing. ix. 327. n. 1.—Salamandra maculosa. Laur. amphib. 33. n. 51, Roessel, Hist. ran. nostr. frontisp. Wurfbain, Salamandrol. 65. t. 2. f. 2. Johnst. quadr. t. 77. f. 10. Imperat. nat. 918. Olear. Mus. t. 8. f. 4. Seba, Mus. ii. t. 15. f. 5.

Var. β. Salamandra atra. Laurent. amphib. 33. n. 50. t. 1. f. 2.

γ. Salamandra fusca. Laur. amphib. 33. n. 52.

δ. Salamandra candida. Laur. amphib. 32. n.

49. Wurfbain, Salam. t. 2. f. 1.

ε. Salamandra exigua fusca*. Laur. amphib.

41. n. 48. t. 3. f. 4.

* This last variety seems rather of a different species, the tail being somewhat flattened at the sides.—T.

Salaman-
der.

that his faith is only enjoyed when in excess, and that he is never perfectly master of it, except when capriciously refusing his assent to truth, and blindly believing in the reality of chimerical beings. He is, however, unable to exercise this empire of diseased fancy, except when the feeble rays of truth faintly gleam from a distance on the objects of this arbitrary faith; when they are separated from him by distance of space or time, or by something in their natures that prevents an accurate investigation. Hence hardly any of the orders in the animal kingdom have given rise to so many fables, as that of lizards.

We have already had occasion to notice some very absurd imaginary properties, that are attributed to several of the oviparous quadrupeds; but, with regard to the lizard at present under our review, the inventive faculty has outstripped all its former imaginations. While the hardest bodies are unable to resist the force of fire, it has been conceived that a small lizard should not only remain unconsumed in the midst of flames,

flames, but that it should even extinguish them. And, as agreeable fables are easily believed, people have eagerly listened to the fancied history of this favoured animal, which is so superior to the most active of all the agents of nature, and which was so well fitted to supply poetry with families, lovers with emblems of gallantry, and heroes with brilliant devices for the ornaments of valour. The ancients, who believed in this singular property of the salamander, being desirous that its origin should appear equally surprising with its qualities, have endeavoured to realize the ingenious fictions of the poets: Accordingly they relate, that it derives its existence from the purest of all the elements, in which it could not be consumed; and have considered the salamander, though endowed with a body of ice, as the daughter of fire. Even the moderns have adopted these absurd fables of the ancients; and, as those who once overstep the boundaries of truth never turn back, they have even conceived that it should be able to extinguish the fiercest and largest fires.

Salamander.

Salamander.

fires. Taking advantage of this strange credulity, cunning knaves have been in use to sell this insignificant lizard at a large price, persuading their silly dupes that, if thrown into the middle of the most extensive conflagration, it would instantly stop its progress. It has even required repeated experiments, made by philosophers, to show the falsity of this nonsense, which reason alone might have disproved; and it has been only of late, since the light of science has become extensive, that this fire-extinguishing property of the salamander has been disbelieved.

Though this lizard inhabits many parts of the Old World, and even in tolerably high latitudes, it has been very little observed; because it is seldom seen out of its hole, and because it has always been an object of terror: Even Aristotle seems to speak of it as an animal which he hardly knew.

The salamander is very easily distinguished from all the preceding lizards, by the particular structure of its fore feet, which have only four toes on each, while each of
the

the hind feet has five. One of the largest specimens in the Royal Cabinet, measures seven inches and five lines from the tip of the muzzle to the origin of the tail, which is three inches and eight lines in length. The skin has no appearance of scales, but is covered all over with a vast number of little protuberances, which are all pierced with numerous holes or pores, some of which are perceivable by the naked eye: Through these there issues out a kind of milky liquor, which forms a transparent varnish all over the naturally dry skin of the animal.

Salamander.

The eyes are situated on the upper part of the head, which is somewhat flat, and their orbits are protuberant even on the roof of the mouth, where they are surrounded by a row of very small teeth, similar to those in the jaws*: Which circumstance forms an additional trait of resemblance between lizards and fish, many of which latter animals have teeth at the bottom

* Memoirs for a Nat. Hist. of animals; article Salamander.

Salamander.

tom of the mouth. The colour of this lizard is very dark brown, almost black, verging to blue on the belly; the whole of the body, the legs, head, and even the eyelids, having irregular yellow spots of considerable size; some of these along the back form two almost uninterrupted longitudinal stripes, from behind the eyes to the root of the tail; and some of them are sprinkled all over with small black dots. From the figure of these spots, this animal, as well as the starry lizard, or real stellion, the green lizard, and the geckotte, have all been named stellion by different writers. The colour of the salamander is subject to variety; some individuals being found, in the marshy woods of Germany, which are entirely black on the upper parts of the body and yellow underneath*. The black salamander, found by Laurenti in the Alps, which that naturalist considers as a distinct species, is probably only a similar variety; as it resembles the common salamander too much in its general form to constitute a separate

* Matthiol, Dioscorid. 274.

parate species. The tail is almost cylindrical, and appears as if divided into rings, by several soft puffy swellings. There are no ribs in this species; in which circumstance, and in the general figure of the fore part of its body, it resembles the frog.

Salamander.

When touched, the salamander covers itself suddenly all over with the milky fluid of which mention has been made already, and it can restore the dryness of its skin at pleasure with equal quickness and facility. This fluid, which exudes from the pores on the surface of the skin, is extremely acrid; the smallest drop of it, when applied to the tongue, giving a smart sensation of pain: It resembles somewhat the milky acrid juice of euphorbium and other lactiferous acrid plants; and is considered as an excellent depilatory, or means of removing hair *. When crushed, or even when squeezed, this animal emits a very offensive odour, which is peculiar to itself.

The salamander delights in cold damp places; particularly the deepest shades of

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thick

* Gefner, de Quadr. Ovip. 79. de Salamandra.

Salaman-
der.

thick woods on lofty mountains, or the sides of springs in low grounds. It retires sometimes in great multitudes, into the hollows of old trees, under the roots of hedges, or under old rotten logs: And, in cold countries, it spends the winter, a great many together, rolled up in subterraneous holes.

Having only four toes on each of the fore paws, and all its toes being entirely destitute of claws, the salamander is very different in its habits from most of the other lizards; as, instead of being able to climb readily upon trees, it seems even difficult for it to crawl on the ground, and it always proceeds with great slowness, seldom going to any distance from its retreats. It spends much the greater part of its life under ground, or in holes and below stones or rotten trees, or under the foundations of old walls, appearing to dread the heat of the sun, which might destroy it by too much dryness; and it hardly ever quits these sheltered situations, except before rain, as if to bathe itself in an element so congenial

nial with the coldness and moisture of its own nature ; or, perhaps, it may then find food with greater readiness. It feeds on flies, beetles, snails, and earth-worms. When at rest, it very often rolls itself up, into a spiral or coil, like a serpent. It is able to remain a considerable time in water ; some having even been kept in that situation for six months without food, only taking care to change the water frequently ; but it often raises its nostrils above the surface, on purpose to breathe, air being absolutely necessary to all oviparous quadrupeds, unless when in a state of torpor or of hybernation. While in the water, it sometimes throws off a thin skin or pellicle, of a greenish ash-colour.

Salamander.

The salamander has no apparent openings to the ears, in which it resembles the serpent tribe. It has even been supposed entirely deaf, and is accordingly called *le sourd*, or the deaf lizard, in some parts of France : This opinion, however, is confirmed by its having no voice whatever ; as, in general, silence or dumbness is connected

Salaman-
der.

ned with deafness. Hence, as in all probability it is destitute of one of the senses, and is entirely deprived of any means of communicating its sensations to other animals of the same species, even by the slightest sounds, it must be endowed with very imperfect and inferior instinct. Accordingly, it is extremely stupid; and, though it has been conceived to be extremely courageous and to despise danger, it is only incapable of perceiving it, and constantly keeps on its way whatever attempts may be made, by gestures or noise, to terrify and turn it back: But, as no animal whatever is entirely destitute of the necessary sentiments for self preservation, it compresses or squeezes its skin when irritated, and spurts out against its enemy some of the acrid milky liquid which it secretes. When struck, it immediately erects its tail, and becomes quite motionless, as if seized by a kind of palsy; for it cannot be conceived, as some naturalists pretend, that so stupid an animal should have cunning enough to counterfeit death. It is extremely tenacious of life,
and

and is difficultly killed ; but if wetted with vinegar, or sprinkled with powdered salt, it soon dies in convulsions, as is the case with several other lizards, and most worms.

Salamander.

It would appear, that mankind have never attributed chimerical properties to any being, without refusing, at the same time, to acknowledge some of its real properties. The cold salamander has been regarded as possessing the miraculous property of resisting the force of fire, and even of extinguishing it ; but it has been debased as low in other respects, as it is raised by this single privilege. It has been considered as the most fatal of all animals, by the ancients, and even Pliny * supposes it to be possessed of the most dangerous of all poisons. It has even been alledged, that, by infecting all the vegetables of an extensive country with its venom, it was capable of extirpating whole nations. Even the moderns have long given credit to the poisonous qualities of the salamander ; believing that its bite was equally mortal with

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that

* Hist. Natur. lib. xxix. chap. 4.

Salaman-
der.

that of the viper *, and have eagerly inquired after remedies against its poison. Philosophers have at last had recourse to observation and experiment, by which road they ought to have begun. The famous Bacon first recommended to inquire by means of experiment, whether the salamander were actually venomous: Gesner proved that no means of irritation could induce it to bite; and Wurfbain showed that it might be touched with safety, and that the water of springs or fountains in which it inhabited might be drank with impunity. M. de Maupertuis †, likewise, has employed himself in experiments to investigate the truth of the pretended poison of the salamander, and has demonstrated that it submitted to the action of fire in the same manner with all other animals: According to his observations, the instant it touches the fire, its whole surface becomes covered with drops of the milky fluid, which exudes from every pore of the skin, particularly on

* Matthioli, Dioscorid. lib. vi. chap. 4.

† Memoirs de l'Academie des Sciences, An. 1727.

on the head, and from the little tubercular protuberances ; and this liquid is quickly dried up by the heat. It seems scarcely necessary to add, that this fluid can never be produced in sufficient abundance to extinguish even the smallest fire.

Salamander.

In the course of the experiments of M. de Maupertuis, he could never get a salamander to open its mouth by any degree of irritation, but was always obliged to open it by force. As its teeth are extremely small, he found great difficulty in finding any animal with a skin sufficiently delicate to be scratched or wounded by them. He tried ineffectually to make them penetrate the flesh of a fowl, after being stripped of its feathers, by pressing them against the skin ; but they were displaced, instead of penetrating : He at last, however, succeeded in wounding the thigh of a fowl, after taking off the skin ; and likewise contrived, in a similar manner, to wound the tongue and lips of a dog, and the tongue of a turkey cock, with the teeth of a new caught salamander ; but in none of these

Salaman-
der.

instances was there the smallest inconvenience produced. He afterwards made a dog and a turkey cock swallow some salamanders, either whole or cut in pieces, but without the least appearance of injury.

Since that time, M. Laurenti has made additional experiments on the same subject; having obliged nimble lizards to bite salamanders, and to swallow some of the milky liquor which exudes from their pores*. In all these instances, the nimble lizards died very soon after; so that the acrid exudation of the salamander is even a mortal poison to some animals, particularly small ones, while it does not seem in the smallest degree noxious to larger animals.

It was long believed that the salamander was androgynous, each individual being capable of reproducing by itself, without the assistance of any sexual intercourse, as is the case in several species of worms†.

This

* J. N. Laurenti, Specimen Medicum. 158.

† Geo. Agricol. et Conrad Gesner, de Quadr. Ovip. de Salamandra.

This is not the most absurd of the fables that have been invented, relative to the natural history of the salamander: And, though their manner of coming into the world is not quite so singular, it is still particular, and deserves the notice of naturalists much more than those wonderful fables that have been so long attributed to it; as it differs from that of almost all the other lizards, and is similar to that of the seps, the chalcides, vipers, and several other serpents. M. de Maupertuis, having opened several salamanders, found in some of them both eggs and young salamanders perfectly formed. The eggs were collected in two longish clusters, and the young animals were contained in two transparent tubes: These were equally well formed as the old animals, and much more active. Thus the female salamander produces its young into the world alive, after having hatched them within her own body, in the same manner with vipers *.

Salamander.

Wurfbain

* Ray, Synopf. Quadrup. Ovip. 274.

Salamander.

Wurfbain and Imperati pretend that the salamander lays elyptical eggs, like those of the aquatic lizard, and that these produce a kind of tadpoles or larvae, which afterwards become perfect salamanders. With regard to the former fact, of their young being hatched within the body, we have had frequent opportunities of verifying it by inspection, and it was long ago known to Gesner, but we have never been able to ascertain the truth of the latter. It would certainly be a very singular and interesting fact, to find an animal that should produce its young in two such very different manners; the mother laying some of her eggs to be hatched out of the body, so as to produce a kind of intermediate animal, that required to undergo a transformation before it arrived at its perfect state, while another part of her eggs were hatched within her body, and the foetuses retained there, in certain tubes, until they were ready to be protruded as perfectly formed animals. To ascertain this, it would be necessary to open a great number of female salamanders,

at

at different successive periods, with very small intervals, beginning immediately after intercourse until after the breeding season was completely finished; and, if the fact turns out as stated by Wurfbaïn and Imperati, it would be farther requisite carefully to observe the growth and development, both of the young which are born perfectly formed, and of those which are produced from eggs that are not hatched within the mother, and to compare the two with great accuracy. However this investigation may terminate, it is unquestionable that the female of this species does produce young that are already formed, and that she is very fertile. It has been long known to naturalists, that she produces as far as forty or fifty in a season*; and M. de Maupertuis has counted forty-two young salamanders within the body of one female, and forty-four in another instance. The young salamanders are at first black, almost without any yellow spots; and in some places they remain so through their whole life;

Salamander.

* Gesner, de Salamand. 79.

156 OVIPAROUS QUADRUPEDS.

Salaman-
der.

life ; from which circumstance, as has been already mentioned, they have been sometimes considered as distinct species.

The following extract of a letter, from D. Saint-Julien, a Benedictine of the congregation of Cluni, gives some very interesting observations on the manner in which the salamander is produced * : ‘ About the
‘ end of spring 1787, I found a fine speci-
‘ men of the salamander, of that kind which
‘ is called *Scorpion* in Lower Guienne, and
‘ which is there confounded with the true
‘ scorpion. It measured somewhat more
‘ than eight inches in total length. Being
‘ very protuberant in the belly, I entertain-
‘ ed great hopes of being able to throw
‘ some light on the nature of the genera-
‘ tion of this animal, and immediately pro-
‘ ceeded to dissect it, beginning at the anus.
‘ Having made an opening of about half
‘ an inch in length, a kind of bag protrud-
‘ ed, which I at first mistook for part of
‘ the alimentary canal, but I soon perceiv-
ed

* In the original this is put in the appendix, but is here joined to the text.—T.

' ed a very sensible motion within it, and
 ' could even distinguish, through its thin
 ' and almost transparent coats, that it con-
 ' tained certain small moving bodies, which
 ' I no longer hesitated in supposing the
 ' young of the animal. Having laid bare
 ' this sack, till I found its neck, I opened
 ' it in its whole length : It was full of a
 ' fanious fluid, in which the young ani-
 ' mals were folded double, exactly in the
 ' same manner with the small aquatic li-
 ' zards which Spalanzani describes as in-
 ' cluded in the amnios. When this liquor
 ' had run out on the table, the young sa-
 ' lamanders extended themselves, and leapt
 ' about very briskly. There were seven
 ' or eight of these ; and having examined
 ' them attentively, both with the naked eye
 ' and with the assistance of a magnifier, I
 ' could readily see that they had much the
 ' appearance of minute fish, having two
 ' tolerably long fins near the head. The
 ' head was large in proportion to the bo-
 ' dy; having large, bright, prominent eyes.
 ' There were no appearance whatever of
 hind

Salamander.

‘ hind legs, or any thing else in their stead.
 ‘ As the mother was found in water, and
 ‘ seemed very near the time of bringing
 ‘ forth her young, it appeared to me that
 ‘ the water is the natural element of the
 ‘ new-born salamanders, which idea was
 ‘ strongly confirmed by their fish-like struc-
 ‘ ture : I therefore placed them in a bowl
 ‘ of water, in which they swam about very
 ‘ nimbly.

‘ I proceeded to examine the mother,
 ‘ and soon discovered two similar bags with
 ‘ the one already mentioned ; all of them
 ‘ being divided from one another by stran-
 ‘ gulations or narrow necks. On opening
 ‘ these bags, I procured a number of little
 ‘ animals, exactly resembling those in the
 ‘ first, and almost equally well formed :
 ‘ They were divided into little clusters of
 ‘ eight or ten together, without any inter-
 ‘ veening septum or separating membrane.
 ‘ In a fourth bag, similar to the former, I
 ‘ found more of these animals, but not so
 ‘ completely formed : Almost every one of
 ‘ these last had a deep yellow protuberance
 ‘ on

‘ on its right side : These all possessed mo-
 ‘ tion, but were unable to leap about like
 ‘ the former more advanced foetuses, and
 ‘ it was necessary to assist them with pin-
 ‘ cers to get out of the bag. In a fifth
 ‘ bag I found a number of similar animal-
 ‘ cules, of which only the posterior half of
 ‘ the body and the tail were distinctly
 ‘ formed, which part had an evident pow-
 ‘ er of motion ; the fore part of the body
 ‘ consisting only of the yellow protuber-
 ‘ ance just mentioned. I extracted alto-
 ‘ gether twenty-eight or thirty of these lit-
 ‘ tle animals, perfectly formed, which swam
 ‘ about in the water, and continued to live
 ‘ for twenty-four hours : The abortions,
 ‘ if I may so call the incomplete animal-
 ‘ cules, sunk to the bottom of the water,
 ‘ without showing any more signs of life.

‘ Continuing my researches beyond these
 ‘ five bags, which resembled a single nar-
 ‘ row gut, divided by several strictures, I
 ‘ found two clusters of eggs ; each egg
 ‘ being of a spherical form about a line in
 ‘ diameter, and very much resembling the
 ‘ yellow

Salamander.

‘ yellow tubercles, that I had seen adhering to the half formed foetuses. I did not count the number of these eggs, but their disposition was very similar to a bunch of grapes, the stalk being fixed to the back bone, immediately behind a deep brown membranous bag which hung a little behind the fore legs of the mother. This bag was evidently the stomach, as I found it to contain some small snails, beetles, and blackish sand.’

In the Memoirs of the Stockholm Academy *, M. Thunberg describes a lizard, under the name of *lacerta japonica*, or japanese lizard, which seems only to differ from

* April quarter, for the year 1787.

If the following, from the *Systema Naturæ*, be the same with the animal described by Thunberg, it is a very different species from the salamander, having claws and scales.—T.

Lacerta japonica: Having a long round tail; with four toes on the fore feet; all the toes having claws; the back being spotted. *Syst. Nat. ed. Gmel. i. 1076. G. 122. sp. 70.*

Salamandra japonica. Houttuyn, act. Vliissing. IX. 329. n. 3. f. 3.

from our salamander in the arrangement of its colours. That animal is almost black, with several irregular whitish spots on the upper part of the body and legs. The back has a longitudinal dirty white streak, divided into two near the head, and extending irregularly and narrowing to the extremity of the tail. This stripe is sprinkled all over with small black spots, which is one of the characters of our salamander. We think ourselves warranted to consider this japanese lizard as a constant variety of the salamander, modified perhaps by the climate of Japan. It is mostly found in the mountains, and in stony places, in which circumstance likewise it resembles our salamander. The japanese attribute to this animal the same stimulant properties that have been supposed possessed by the scink, and by the ask, or water salamander; and, accordingly, numbers of these lizards may be seen at Jedo, dried and hung up in the shops for sale.

Salamander.

ART. LV. THE ASK*.

Ask.

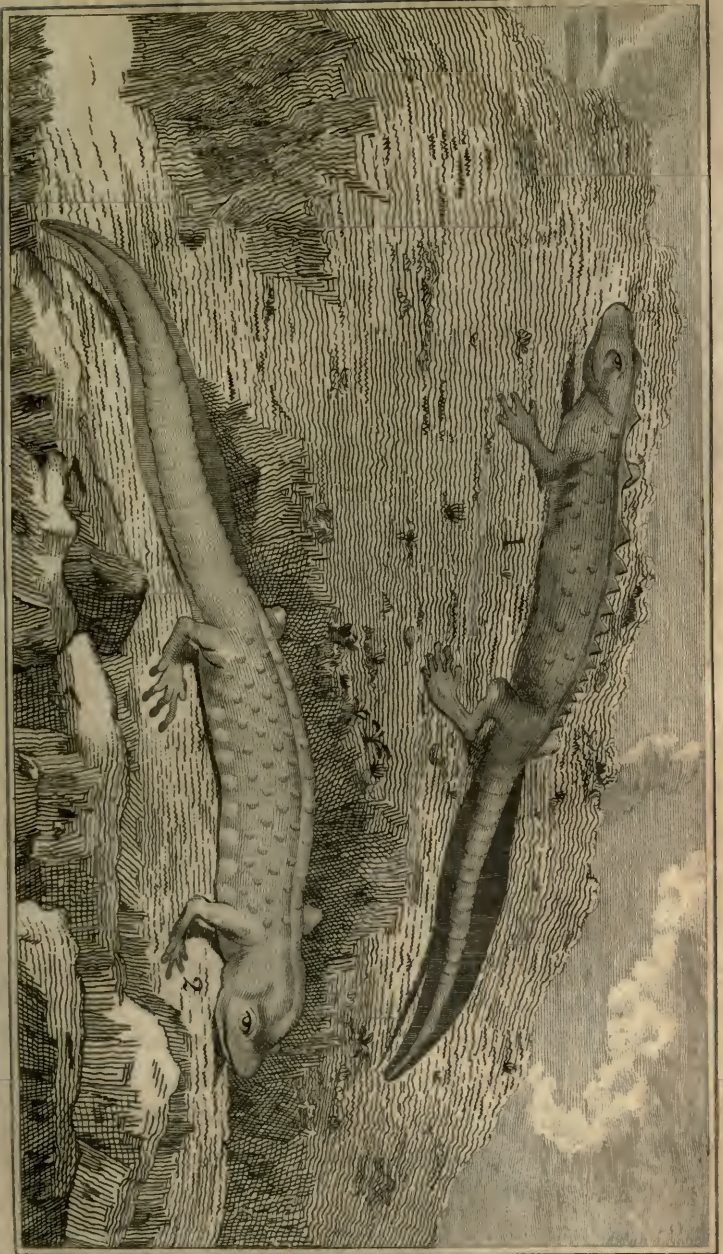
THIS, like the former, species is able to live both in the water and on dry land; but the former is mostly found in the holes of old walls or under ground, while this species prefers the water; from which circumstance it has been called the water

* La Salamandre à queue plate. Encyclop. Method. —Called Taffot, in old French.—Marasandola, in Italian.—Ask, in Scotch.—Σαυγος ενυδρος, in Greek.

The Scotch name *Ask*, is here preferred, for the purpose of a single term.—T.

Lacerta palustris: Of a brown colour; having a lance-shaped tail, flattened at the sides, of a moderate length; the back of the male being crested, in spring. Syst. Nat. ed. Gmel. i. 1065. G. 122. sp. 44. Faun. suec. 281. Edw. glean. t. 259.

Salamandra aquatica. Houttuyn, act. Vliſſing. ix. 330. Ray, Synopf. quadr. 273.—*Salamandra alepidota verrucosa*. Gronov. Mus. ii. 77. n. 51.—*Triton palustris*. Laurent. amphib. 39. n. 43. t. 4. f. 2.—*Lacerta aquatica*.—Sibbald, Scot. illustr. Wulf. Ichthiol. boruss.—*Lacertus aquaticus*. Gefner, de Quadr. ovip. 28.—Warty lizard. Penn. Brit. Zool. iii. p. 22. n. 8. t. 3. f. 1.



Ask. - 1. Male. - 2. Female.

Archer Sculpt.

water and the marsh lizard, by different Ask.
 naturalists. It resembles the salamander in
 having no sensible scales on the skin, no
 claws, and only four toes on each fore foot;
 but it differs very essential in the form and
 structure of the tail. The ask is found to
 vary considerably in colour, according to
 the age and sex of the individual; and it
 would appear, that there are several per-
 manent varieties, differing from each other
 in size and colour, occasioned principally
 by difference of climate or even of food*.
 We do not, however, agree with M. Du-
 fay † in adopting three distinct species of
 the ask; as, on reading his memoir on this
 subject with the greatest attention, the dif-
 ferences which he considers as sufficient to
 establish diversity of species, seem only cal-
 culated to point out a permanency in the
 three varieties.

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The

* Gefner, de Quadrup. ovip. 28.—Letter from Mr
 David Erskine Baker, to the President of the Royal
 Society; in the Philosoph. Transac. of 1747, No. 483.

† Memoir, by M. Dufay, in the Mem. de l'Acad.
 des Sciences, for 1729.

Ask.

The largest ask seldom exceeds six or seven inches in length. The head is flattened ; having a large short tongue. The skin is harsh, and gives out a kind of milky liquor when wounded. The general colour is brown of different shades on the upper part of the body, and becoming of a whitish yellow on the belly ; the whole body being interspersed with very small whitish projecting warts or tubercles. For the most part, the skin has several round darker spots, especially on the male, which are bluish, or variously situated, in some varieties.

The male of this species is remarkably distinguished from the female, by having a serrated or notched membranous crest along the back *, from the middle of the head to the tip of the tail ; on which last the notches are either altogether wanting or hardly sensible. Both in the male and female, the tail is furnished with a vertical membrane, both above and below, along its

* In the *Systema Naturæ*, this membranous crest or ridge is said only to exist on the male during spring.—T.

its whole length, the membrane on the under side being very bright white: This conformation makes the tail of the ask appear extremely flat at the sides, and from it the species is named in French the flat-tailed salamander. The female has no crest on the back; having, on the contrary, a longitudinal furrow on the middle, from the back of the head to the origin of the tail: But, when very lean, the ridge of the back-bone sometimes projects, so as to form a slight longitudinal eminence. In general the colours of the female are paler and more uniform than in the males; and the young asks resemble the females in colour.

This species especially frequents stagnant and muddy waters, old quarry-holes, ditches, marshes, and ponds, being very seldom found in running streams; and it keeps generally concealed under stones: In winter it, for the most part, retires into holes under ground, in marshy places, or into damp drains. When on dry land, it walks slowly and with difficulty; but swims in the water with great

L 3

readiness.

Ask. . . . readiness. It comes very often to the surface of the water, on purpose to breath ; and is then sometimes heard to emit a kind of hissing noise. It is very tenacious of life ; and, being neither so deaf or so silent as the salamander, its instincts are more perfect than those of that species. The ridiculous fable, which has been so long and often repeated, respecting the salamander, has not been extended to this species : But, though the ask has never had attributed to it the false property of living in the midst of fire, it has been discovered really to possess the opposite quality of preserving its life in the middle of ice *. It is sometimes caught by the sudden formation of ice, in the ditches or ponds where it inhabits ; and remains in a torpid state, till by the return of warm weather its prison becomes melted, when it recovers at the same time its liberty and powers of motion. Sometimes even in summer, asks have been found enveloped in lumps of ice taken from ice-houses, in which they must have remained without

* Memoir, by M. Dufay, already cited.

without food or motion, from the time of the winter frost. This apparently surprising phenomenon, depends on the general properties of lizards and other oviparous quadrupeds, which have been already noticed, in our general discourse on the nature of this class of animals.

The teeth of the ask are so small as to be scarcely perceptible ; and it never bites, unless its mouth is forced open. It feeds on flies and various insects, which it catches on the surface of the water, on frogs spawn, &c. : It likewise eats the marsh vegetables which float on the surface of pools and stagnant waters.

The manner in which the young of this species are gradually expanded, is so curious and interesting as to deserve very particular notice. The female ask lays in the water a number of eggs in May or June : In some varieties there are twenty of these eggs, connected together in two strings by a viscid substance, which likewise surrounds each single egg. The eggs are provided with the glairy substance, in

Ask.

two white and very much contorted canals, into which they fall after leaving the ovaries : These ducts are situated within the body of the female, one on each side of the back bone, and reach from near the fore legs almost to the root of the tail. A number of very small yellowish eggs may be seen attached to the sides of the ovaries : These grow gradually larger as the spring advances ; and such as are come to maturity in the breeding season, drop from the ovaries into the white contorted oviducts just mentioned *. After the eggs are protruded from the mother, they sink to the bottom, and sometimes rise for a little to the surface, in consequence of some globules of air, which form in the glairy matter that surrounds them ; but that air soon escapes, and they sink again.

As the eggs increase, the young asks may be distinctly perceived through the glairy matter which surrounds them, inclosed in a fluid and coiled up within a transparent membrane, which serves in
place

* Spallanzanis Essays, vol. iii.

place of the egg-shell. The foetuses gradually become larger, and soon begin to move ; at first slowly, but afterwards with great agility ; and at last, after eight or ten days according to the climate or season, they tear their passage through the membrane. Spallanzani chuses to call this membranous covering the *amnios* of the young ask, as he does not consider the included mass as at all analogous with an egg. When the young asks first get free from the membranes, they have somewhat of the structure of fishes, in the same manner with young frogs. The feet are extremely short, and the shoulders are furnished with small fringed tufts, projecting vertically outwards in the water: These resemble feathers, and are considered as a kind of fins ; they are attached to a kind of notched cartilaginous half rings, usually about four on each side, which are analagous with the gills of fishes. These are all separated from each other, but communicate with the same interior cavity, and are covered by a membranous flap, through which the fringed

Ask. ed tufts or fins have room to pass. When the animal becomes larger, the tufts diminish in size, and at last disappear; the flap adheres to the skin, without leaving any opening; and the cartilaginous half rings grow together, so as to form a membrane. There is reason to presume that these organs serve the same purpose with the gills of fishes, for separating the air which is contained in the water, to answer instead of respiration while the ask is young; and when it grows older, it loses this particular structure, and is then obliged to come more frequently to the surface, and to inspire atmospheric air into its lungs.

We have already remarked, that almost all lizards change their skin once or twice every year; but the ask undergoes this change much oftener, having in this circumstance another point of resemblance with frogs, which we shall hereafter find to change their skins very frequently. As the ask has most activity in summer, or even in spring, it must at that time both exhaust and repair its force and substance the quicker; and

and accordingly it throws off its skin, as Ask.
 some authors alledge *, every four or five
 days, or every fifteen or twenty-one days,
 according to other naturalists †: As the
 frequency of these changes must necessarily
 depend on the temperature of the season or
 climate, on the nature of the food, and se-
 veral other accidental causes, there is rea-
 son to suppose that both of these opinions
 may be true. A day or two before the
 change of skin, the animal becomes more
 inactive than ordinary, paying no attention
 to such worms and insects as come in its
 way, which it swallows greedily at other
 times. The colour of the skin becomes
 duller than usual, and the skin separates from
 the body in different places. It first uses
 the fore feet to tear a hole in the skin round
 the jaws: It then pushes the skin gradual-
 ly over the head, and draws out the fore
 feet one after the other; but is obliged to
 rub itself against the stones or gravel at the
 bottom of the water, to enable it to get the
 old

* Memoir by M. Dufay formerly quoted.

† Letter from Mr D. E. Baker, already referred to,

Ask. old skin pushed backwards, turning it inside out over the hinder part of the body and tail; it then takes hold of it in its mouth, and, disengaging the hind feet one after the other, pulls it away entirely.

If this cast skin be carefully examined, it is found completely inverted, but without the smallest rent. The skin which covered the hind legs is inverted like a glove, all the toes being distinctly perceptible; while that part which covered the fore legs is concealed in the inside of the empty bag. The place of the eyes may be seen, by means of two holes; so that the eyes of the ask do not cast their skin, as will hereafter be found to take place in some species of serpents. After this operation is finished, which usually occupies about an hour and a half, the ask becomes very active, and its new skin appears very smooth and brightly coloured. This process, which is very accurately described by Mr D. E. Baker, in the letter already referred to, may be very easily observed, by keeping one or two of these lizards in a jar of water.

In

In carefully observing some individuals of this species, M. Dufay perceived a kind of round tube, almost equal in length to the animals body, and about a line in diameter, protruded from the anus; though frequently assisted by the feet and the mouth, it took a whole day to come out. When examined in the microscope, this tube seemed all over perforated with small round holes, very regularly arranged; one of its ends contained a small pointed bone, and the other end was furnished with small fringes, which issued from two adjoining holes. M. Dufay very properly conjectures, that this may be the decidua of some viscus, which may sustain a change similar to what is observed every year in the stomachs of certain crustaceous insects *. Ask.

The cast skin of the ask is often found floating on the surface of the water in our marshes. During winter, at least in the temperate countries, having then less force of system, the ask is subject to less frequent changes,

* Memoirs of the Academy of Sciences, for the year

Ask.

changes, and seldom casts its skin oftener than once in a fortnight or three weeks, but as it certainly does suffer this change of skin more than once during the winters of tolerably high latitudes, we may conclude that it does not always hybernate, or become torpid, even in the greatest colds of our climates; and that, by means of the slight degree of heat which it meets with about springs and other retreats which it then chuses, it still retains sufficient warmth of its blood to preserve its interior functions, and to repair the loss of its old skin by reproducing a new one. The frequent changes of skin in this species, is probably owing to the water which it inhabits, softening and injuring the old skin. M. Dufay informs us, that it frequently happens to an ask not to be able to get the old skin entirely removed from one of the feet; and that the portion of skin which remains, becoming corrupted, occasions a species of gangrene of the foot, which falls off, without however killing the animal. They are still more liable to lose some of their toes in this manner; and the accident happens
more

more frequently on the fore than on the hind feet. Ask.

According to the Abbe Spalanzani, the sexual intercourse of the ask takes place, as in frogs, without any intromission; but the feminal liquor finds its way to the ducts into which the eggs fall after leaving the ovaries, as in other lizards. Thus, both in habits and structure, and in the means of continuing the species, the ask unites itself with lizards and frogs. This intercourse is often preceded by a pursuit, on the part of the male, accompanied by repeated gambols, as if intended to heighten the enjoyment by obstacles. The more intimate connection is prefaced by caresses: They pretend to avoid each other at first, to increase the pleasure of their union. In the fine weather of spring, animated even in the middle of the water with the fires of love, these animals of the coldest temperament may be seen frisking about at the bottom of the shallow edges of pools, and playing a number of antic tricks, as if to aid the natural appetite for reproduction. The male

Ask.

male and female sometimes run along together; sometimes the male pursues, and is sometimes pursued. Sometimes he stops, erecting his crest and raising up his back into an arch, through which the female runs in her pretended flight: The male follows her, and she stops; he looks at her stedfastly for a while, then forms again the arch for the female to run through. This sport is frequently repeated; but is changed at length into the closest embraces: The female ceases to run away, and the male, placing himself along side, approaches her with his head, while his body keeps often near an inch distant. His crest shakes carelessly from side to side; the anus is very open; he strikes his companion frequently with his tail; he sometimes throws himself upon his mate, but quickly resumes his former situation. At this time, notwithstanding the distance between them, he spurts out the prolific fluid, which may be perceived tinging the water with a slight blueness. The male becomes occasionally as if quite torpid; but soon recovers, renews his caresses,

careless, and repeats the jets of liquid ; till Ask.
 at length, having compleated his purpose,
 he quits the female, who remains motion-
 less during the whole process*. This sin-
 gular mode of junction is frequently repeat-
 ed, until all the eggs that are of sufficient
 size have dropped from the ovaries into the
 ducts, in which they become covered over
 with the glairy substance, and where in all
 probability they are fecundated. The sea-
 son of love continues longer or shorter, ac-
 cording to the heat of the climate or season,
 but is sometimes for thirty days†.

Mathiolus informs us, that the ask is
 sometimes substituted in medicine for the
 Egyptians scinks; but that their effects can-
 not be supposed equal.

The ask, as well as the salamander, is
 killed by being sprinkled over with sea salt
 in powder. At first it exudes the milky
 fluid, formerly mentioned, from every part
 of its body : It then falls into convulsions,

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* Observations made by M. Demours, of the Aca-
 demy of Sciences.

† Spallanzanis Essays.

Ask.

and expires in about three minutes. It appears from the experiments of Laurenti, that this species is not venomous, as has been supposed by the ancients, and that it is only dangerous, like the salamander, to other small lizards. A very accurate description of the viscera of this species may be seen in the memoir by M. Dufay, already referred to.

The ask inhabits most countries of Europe, Asia, Africa *, and America. It is even found in Sweden, and other northern countries, where it is in all probability protected from the effects of the cold by living in the middle of water. From its being thus extended almost all over the earth, the ask might properly enough have been called the common lizard; which name has been applied both to the nimble species, and to another which Linnaeus calls *lacerta vulgaris* †, but which seems
only

* Job Ludolph, Hist. Æthiop.

† *Lacerta vulgaris*: Having a round tail of moderate length; with two brown lines along the back; the
fore

only a variety at the most of the ask. The animal named *lacerta aquatica* * by the famous celebrated naturalist, appears likewise to be a variety of the same species. By examining a great number of specimens of the ask both male and female, which are preserved in the Royal Cabinet, we are convinced that all the characters attributed to these two species by Linnaeus, are to be found in the different varieties of our present species. The only circumstance which does not accord with this opinion, is that Linnaeus describes the tail in one instance

M 2

as

fore feet having only four toes. Syst. Nat. ed. Gmel. i. 1076. G. 122. sp. 42. Faun. suec. 281. Id. i. n. 254. Ray, Synopf. quadr. 264.

* *Lacerta aquatica* : Having a roundish tail of moderate length. Syst. Nat. ed. Gmel. i. 1066. G. 122. sp. 43. Faun. suec. 282.—*Salamandra alepidota*. Gronov. mus. ii. 78. n. 52.—*Triton cristatus*. Laurent. amphib. 39. n. 44.—*Lacertus aquaticus*. Gefn. ovip. 31. Wurf Bain, Salamandr. 65. t. 2. f. 2. 3. Mem. de l'Acad. des Scien. A°. 1729. t. 15. f. 1.

Var. β. *Triton parifinus*. Laur. amphib. 40. n. 45.

Var. γ. *Triton salamandroides*. Laur. amphib. 40. n. 47. Wurfb. Salam. t. 2. f. 4.

Ask. as round, and in the other as roundish : But this difficulty is easily obviated ; for it would appear, that Linnaeus had never seen the *L. aquatica**, and Gronovius, whom he quotes, says, that it is almost exactly similar to the ask, and that the tail is thickish and almost square † : Besides, the figure cited from Seba ‡ evidently represents our ask.

* That cannot be, as it is described in his *Fauna Suecica*.—T.

† Gronov. *Mus.* ii. 78. n. 52.

‡ In Gmelins edition, that figure is quoted to a variety of a different species, which has probably an equal right to be considered as belonging to the ask ; viz.

Lacerta lacustris : Of a black colour ; having a flat tail, of moderate length. *Syst. Nat.* ed. Gmel. i. 1065. G. 122. sp. 48.—The following varieties of this species are added by Gmelin:

Var. β. *Salamandra palustris* : Dotted with black, and thrice the size of the common ask. *Laur. amph.* 39. β.

Var. γ. *Triton zeylanicus* : Variegated with white and yellow, and spotted with black. *Laur. amph.* 39. n. 42. Seba, *mus.* ii. t. 12. f. 7.

Var. δ. *Triton carnifex* : Black and tuberculated, dotted on the throat, and spotted on the belly ; the tail being as if bloody. *Laur. amph.* 38. n. 41. t. 2. f. 3.

Var.

ask. Besides, it often happens that the females of the ask appear to have round tails; the membranes, which are usually placed on the upper and under surfaces, being hardly perceptible; and, even in the young males, these membranes are almost entirely wanting, so that their tails appear cylindrical*. With respect to the *lacerta vulgaris*, Linnaeus only quotes Ray†, who, in fact, makes a distinction between that lizard and the ask, but his description of the two agree entirely with our opinion of their identity as to species. All the cir-

M 3 cumstances

Var. 1. *Triton alpestris*: Black, and tuberculated; having a yellow belly. Laur. amph. 38. n. 40. t. 2. f. 4.

Var. 2. *Triton utinensis*: Having a globular head; the back being black, with yellow spots. Id. 38. n. 39.

Var. 3. *Triton Wurfbauii*: Black, with whitish streaks. Id. 38. n. 38. Wurfb. Salam. 54.

Var. 4. *Triton Gesneri*: Black, the belly being dotted with white. Laur. amphib. 38. n. 37.

* Memoir by M. Dufay, already often referred to.

† He likewise quotes his own description of the Swedish animals, in two several editions of the *Fauna Suecica*.—T.

Ask.

cumstances of habit and natural history, which have been attributed to these two pretended distinct species, are precisely similar to those of the ask; so that every thing concurs to prove that they are only varieties of that species. Even Gronovius acknowledges the similarity between the *L. aquatica* and the ask; and the description and figure given by Gesner, can only be referred to the female of the present species. Hence it must be concluded, that the water lizard of Linnaeus and Gronovius, which these naturalists consider as a distinct species, are nothing more than the female ask.

Some differences in colour, which sometimes occur in the female of this species, have induced some naturalists* to believe, that they had ascertained the male and female of this pretended distinct water lizard: And certain other varieties in colour, or in size, have occasioned the introduction of a third species, under the name of the common lizard. But the common and the water lizard, are of the same species with

* Petiver, Museum. 18. n. 113.

the ask; which has been suspected even by Ask.
 Linnaeus, as he inserts a question, if the
 water lizard may not be a young common
 lizard, and if both of these may not be fe-
 males of the *lacerta palustris*, or ask. And
 this is placed beyond doubt, by the figures
 which he quotes, particularly those of Seba
 and Gefner. This opinion, of the identity
 of the three Linnaean species, has not been
 adopted without the most attentive compa-
 rison of a great number of specimens of
 several different varieties of the ask.

The aquatic lizard, known in Mexico by
 the name of Axolotl, called Inguete de A-
 gua by the Spaniards, is probably to be re-
 ferred to this species. It has been mista-
 ken for a fish, though it has four feet; but
 we have formerly noticed that the scink
 has been likewise erroneously supposed a
 fish, in consequence of its living in the wa-
 ter. The skin of the axolotl is described
 as very smooth, being scattered all over the

Ask. belly with small spots, which diminish in size from the middle of the body to the tail. The length and size of this animal are similar to those of the ask: Its feet have only four toes, *as in frogs*; from which we may suspect, at least, that the fifth toe is only wanting on the fore legs, as is the case in frogs, salamanders, and asks. The head is large in proportion to the body; having a black mouth which is almost constantly open.

A very absurd fable has been related concerning this animal; it being pretended that the female is subject to a monthly discharge. This ridiculous story may proceed from the female producing her young alive, as in the salamander; and perhaps it ought rather to have been referred to that species than to the present article. The flesh of the axolotl is said to be very good eating, and to resemble that of an eel*. If that is the case, it may perhaps be only a frog in its tadpole state, before the tail has dropped

* Description of New Spain, in the *Histoire générale des Voyages*.

dropped off; but farther observations are required, to enable us to decide with certainty on this subject *.

ART. LVI. *THE PUNCTUATED LIZARD* †.

THIS species is found in Carolina. It has only four toes on the fore feet, and all its toes are without claws. The body is dusky brown, with two longitudinal rows of white dots on the back, which unite into one row. The tail is cylindrical.

Punctat.
ed Lizard.

ART.

* The following species, from Gmelins edition of the *Systema Naturæ*, seems to belong to the ask, at least equally with the *L. aquatica* and *L. vulgaris*.—T.

Lacerta americana: Having a vertically flattened tail, of moderate length; the back being fringed; and the belly yellow, with black spots. *Syst. Nat. ed. Gmel. i. 1065. G. 122. sp. 56. Houttuyn, act. Vliſſing. ix. 330. Seba, Mus. i. t. 89. f. 4. 5.—Triton americanus. Laurent amphib. 40. n. 46.*

† *La Ponctuée. Encyclop Method.*

Lacerta punctata: Having a round tail, of moderate length; the back being longitudinally dotted with white; the fore feet having only four toes, without claws. *Syst. Nat. ed. Gmel. i. 1076. G. 122. sp. 45. —Stellio carolinensis. Catesby, Carol. iii, t. 10. f. 10.*

ART. LVII. *THE FOUR-LINED LIZARD* *.

Four-lined Lizard.

THIS species is found in North America ; at least the specimen in the museum of Prince Adolphus Frederick of Sweden, from which the species is described by Linnaeus, was marked as coming from that country. It is distinguished by having four yellow lines on the upper part of the body, which character likewise occurs in the Algirine lizard formerly described ; but there is no danger of confounding these two with each other, as in the present species there are only four toes on each fore foot, while in that other species all the feet have five toes. In this species there is a slight appearance of claws on the extremities of the toes. The tail is long and round.

ART.

* *La Quatre-raies ; Le Rayé.* Encyclop. Method.

Lacerta quadrilineata : Having a long round tail ; the body having four longitudinal yellow lines ; with four toes scarcely armed with claws on the fore feet. *Syst. Nat. ed. Gmel. i. 1076. G. 122. sp. 46. Mus. ad. frid. i. 46.*

ART. LVIII. THE SARROUBE.

WE are indebted to M. Bruyères, of Sarroube, the Montpellier society, for the following account of this new species of lizard, which he has seen alive in the island of Madagascar, where it is found in great numbers, though no other naturalist or voyager has taken any notice of it. Having only four toes on each of the fore feet, we have considered this species as allied to the salamander and ask, and have accordingly placed it in this division, along with these animals. It is, however, considerably larger than any other species of the division, being usually twelve inches in total length. It is besides covered with very distinct scales, and its toes are all armed with claws; while all the other species of this division have a kind of tubercles instead of scales, and none of them have any claws except the last, in which these are scarcely apparent.

The

Sarroube.

The skin of the sarroube is grained like leather, and very bright, being yellow mottled with green. The neck is very large, its upper part having two rows of bright green scales. The head is flat and lengthened; the mouth being large, and extending beyond the ears. The jaws are naked and indented, but without teeth. The tongue is smeared with a viscid liquor, to catch small insects, on which the animal feeds. The eyes are large, having an oval iris, with a vertical narrow pupil. The skin of the belly is covered by small round yellow scales. The ends of the toes are edged on each side by small membranes, and armed underneath with hooked claws, which are placed between two rows of imbricated scales; in which, and several other circumstances, this species has considerable resemblance to the flat-headed lizard of Madagascar. They resemble each other likewise in having their tails oval and flattened horizontally; but the present species wants the fringed membrane which distinguishes the body of the flat-headed lizard.

M.

M. Bruyères supposes the name Sarroube to be derived from *Sarrout*, which signifies anger in the language of Madagascar. The inhabitants of that island are equally afraid of this species as of the flat-headed lizard; but M. Bruyères considers it as perfectly innocent, having no means whatever of doing injury. It appears to dislike very great heat, as it is much more frequently found during rain than in the dry season, and is more numerous in the woods at night than in the day-time.

Sarroube.

ART. LIX. *THE THREE-TOED LIZARD.*

THIS new species of lizard is allied to the salamander, but is furnished with ribs, and has only three toes on each of the fore feet, while the hind feet have each four toes. It was found by M. le Comte de Mailli Marquis de Nesle on the crater of Mount Vesuvius, surrounded by the burning lava of that volcano; which circumstance might be considered by some people

Three-toed lizard.

as

Three-
toed li-
zard.

as a proof of the power of resisting the force of fire, which has been attributed to the salamander.

The head is flat on the top, and rounded at the muzzle. The tail is longer than the head and body, and tapers to the tip, being frequently rolled up at the end. The colour is dark brown, mixed with reddish on the head, feet, tail, and under parts of the body. The specimen brought from Italy by M. de Nefle, was so much dried that its vertebrae and ribs could be distinctly counted. The head measured three lines in length, the body nine, and the tail sixteen lines and a half.

It is extremely probable, that the singular situation in which this animal was discovered proceeded only from accident; as it can scarcely be conceived, that any animal whatever could exist for any length of time among the burning lava. It may, however, inhabit the neighbourhood of the crater; as great heat seems congenial with the nature of the lizard tribe in general.

OF OVIPAROUS QUADRUPEDS
WITHOUT TAILS.

TO complete the Natural History of Frogs, &c.
in general.
Oviparous Quadrupeds, we have now
only to treat of those which have no tails.
The want of this member forms a perma-
nent and very sensible character, by which
it is easy to separate and distinguish this se-
cond class from the former, in which we
have placed tortoises and lizards, all of
which have tails, though of very different
lengths. Besides this remarkable character,
the present class have other marks by which
they are readily distinguishable. Their size
is very much limited, when compared with
many of the tortoises and lizards, the length
of the largest being seldom more than eight
or ten inches. Their skin has no scales*,
being

* Except in one singular species, the scaly frog.

Frogs, &c.
in general.

being mostly covered by warts or tubercles, and smeared with a viscid liquor. Most of them have only four toes on each of the fore feet, in which circumstance they resemble the salamander and other lizards included in the same division. Some of the species in this division, in place of having five toes on each hind foot, as in most lizards, have six, which are more or less distinct in different species. In several species the toes, both on the hind and fore feet, are distinct and separate from each other; but in other species they are connected together by webs or membranes, as in ducks, geese, and other web-footed water fowls. In all the species of this class, the hind legs are much longer than the fore; from which circumstance most of them do not walk, but leap forwards, using their hind legs as springs, which they fold up beneath them, and then allow them to unbend as it were with violence, so as to throw their bodies sometimes to a considerable height and distance. These hind legs have, for the most part, the foot, from

from the heel forwards, almost equal in length to the whole of the rest of the leg. Frogs, &c.
in general.

The whole animals of this division are greatly more simple in the structure of their skeletons than those of which we have already treated; having, in common with the salamander and most other lizards analogous with that species, no ribs or vertebrae of the neck, or at the most only one or two joints in that part: The head is joined almost immediately with the body, as in fishes; with which class of animals they have considerable analogy, particularly in their habits, and in their mode of generation. They have no external organ of generation: The foetus is not impregnated within the body of the mother; but the eggs are imbued with the prolific liquor from the anus of the male, as they proceed from that of the female: The young appear for a long time very different from the form of their parents, resembling fishes, more or less in different species, in an intermediate state called tadpoles; and they only gradually acquire the proper form of

Frogs, &c.
in general.

the species, by a gradual development of their parts and organs. They have no proper urinary bladder, as we have already seen to be the case with lizards; the receptacle for that excreted fluid, differing in size, form, position, and in the number and nature of the ducts connected with it, from proper urinary bladders.

Such are the chief general facts, which are common to the whole class of oviparous quadrupeds without tails; but, when attentively examined, they will be found to divide themselves into three genera, by circumstances in their structure and habits.

In the first, called Frogs, the head and body are lengthened, angular, and raised into longitudinal ridges; the hinder part of the belly is almost always lank; and the hind legs are very long: In general the length of the fore legs is double the diameter of the body about the breast; and that of the hind legs at least equal to the length of the head and body. The proportions of the animals of this genus are generally agreeable; they leap with great agility; and,
instead

instead of avoiding the light, they seem to delight to bask in the rays of the sun.

Frogs, &c.
in general.

The animals of the second division, named Tree-frogs, are generally smaller than those of the first, and more elegant in all their proportions; and have their toes furnished with little viscid pellets, by which they are enabled to attach themselves even on the under surfaces of the most polished bodies. They are extremely nimble, and leap with great force; and are able to pursue insects, on which they feed, with great agility even on the branches and leaves of trees.

The species which are placed in the third division, named Toads, have their bodies almost round; their head protuberant; their fore feet very short, and the hind feet sometimes not equal in length to the head and body. They do not leap with any agility. They avoid the light, and only leave their retreats at night in search of prey. The eyes of these animals are much better calculated for seeing in a feeble light, than those of the other species of oviparous qua-

196 OVIPAROUS QUADRUPEDS.

Frogs, &c.
in general.

drupeds without tails ; and, when brought into a strong light, the pupils contract into a narrow slit. Thus the toads may be said to differ from frogs and tree-frogs, in the same manner as owls differ from birds that go about in the day.

In the first of these genera, we place twelve species, all of which have angular and elongated heads and bodies : In the second seven species, which are readily distinguishable by the viscous pellets on their toes : And in the third fourteen species, of which neither the head or body have prominent longitudinal ridges. These thirty-three species, divided into frogs, tree-frogs, and toads, form the whole known class of oviparous animals without tails ; and after the most attentive perusal of the descriptions given by authors, and the most accurate investigation of many specimens in the Royal Cabinet, we have considered it proper to arrange under these species all that are mentioned by naturalists and voyagers.

I. DIVISION.

OVIPAROUS QUADRUPEDS
WITHOUT TAILS,

*Having their Heads and Bodies lengthened
and angular,*

FROGS.

ART. I. THE EDIBLE FROG*.

IT is a serious misfortune to resemble de-
testable objects. The edible frog has
so strong a similarity to the toad, as hardly

Edible
Frog.

N 3 ever

* La Grenouille commune, ou mangeable:—ΒΑΤΡΑΧΟΣ
λαίος. Encyclop. Method.

Rana esculenta: Having an angular body; the back
being transversely prominent, and the belly marginat-
ed. Syft. Nat. ed Gmel. i. 1053. G. 120. sp. 15. Faun.
fuec. 279. Laurent. amphib. Wulff. Ichthyol. boruf.—

Rana

Edible
Frog.

ever to be seen without raising ideas of that hideous animal; so that people are induced to include both in the same disgrace, and to refer to our present species the abject habits, disgusting propensities, and dangerous properties of the toad. It may be extremely difficult to place the edible frog in that point of view to our readers which it really occupies in nature; but, if toads had never existed to present an abominable object of comparison, which is equally deformed in its appearance and detestable to come near, the edible frog would have always remained as agreeable in its form, as it is valuable in its qualities, and interesting in the various singular phenomena which it presents to us in different periods of its life. We should in that case have always

Rana gibbosa. Gefn. quad. ovip. 41.—*Rana viridis aquatica*. Roef. hist. ran. 51. t. 13. 14.—Edible Frog. Brit. Zool. iii. 13. n. 3.—*Rana*. Sibbald. Scot. illustr.

This species is named *Grenouille commune*, in the original; but as the name of common frog has usually been applied in Britain to the subsequent species, the name used by Linnaeus, Pennant, and Daubenton, in Latin, English, and French, is here retained.—T.

ways observed it, as a useful animal having no power or inclination to do injury; as possessing a handsome form of body, with activity and elegance of limbs; and as ornamented with beautiful and varied colours, increased in their brilliance by a viscid fluid, which covers the whole skin as with a fine transparent varnish.

Edible
Frog.

When out of the water, instead of having its head low towards the ground and crouching its body meanly in the dirt, the edible frog holds its head erect, and moves by lofty leaps, by means of the spring of its hind legs, sometimes even leaping several feet high. It would seem to desire the enjoyment of pure air, as it always sits with its head high, holding up its body by means of the fore legs, and resting on its hind legs folded in below its belly, ready to spring; having rather the erected attitude of an animal endowed with a certain dignity of instinct, than the mean squat horizontal crouch of a vile reptile. It is so extremely sensible in every part of its body, and so very elastic, that the instant it is

Edible
Frog.

touched, especially if taken by the hind legs, it raises its back with great quickness, and every part of its body shows, by the promptitude of its motions, the agility of an animal that hastens to escape from danger.

The muzzle terminates in a sharp point, having the nostrils situated near the end. The eyes are large and bright, being surrounded by a golden yellow circle. The ears are situated directly behind the eyes, and covered over by a membrane. The mouth is large, and without teeth. The body is narrow behind, its back being covered by tubercles and asperities. We have formerly had frequent occasion to mention these tubercles, which are found increasing the strength of the hard scales of crocodiles and other large lizards, and even on the weakest and smallest oviparous quadrupeds, which have delicate soft skins, and no other defence or asylum except the water which they usually inhabit.

The upper parts of the body are green, of different shades, having three longitudi-

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Edible
Frog.

nal yellow lines on the back, the middle line being somewhat sunk, and the other two slightly ridged. The under parts of the body are white, having black spots on the hinder part of the belly, which extend over the whole under parts as the animal increases in size, and at last even reach the back and sides. What then should make us view with horror, an animal that thus unites, elegance of shape, beauty of colour, gracefulness of attitude, and agility in all its motions? Let us not foolishly deprive ourselves of an additional pleasure, in our rural walks, by being filled with disgust at seeing the meadows and the banks of rivulets embellished by the lively colours of this innocent animal, and enlivened by its light and active motions: We ought rather to admire the ingenuity of its evolutions, and the elegance of its movements in the water, which it animates without being guilty of violence, and which it adorns with the beauty of its colours; while swimming with velocity, or when remaining motionless, or crawling at the bottom.

The

Edible
Frog.

The fore feet have each four divided toes, and the hind feet have each five which are united by webs or membranes: On all the feet the inner toes are longer than the others, and at some distance from them. The size of this species varies according to climate, temperature, food, and other causes: In the temperate regions it usually measures from two to three inches from the end of the muzzle to the anus: The hind legs, when extended, measure four inches in length to the extremity of the toes; and the fore legs about one inch and a half.

As in all oviparous quadrupeds, the heart has only one auricle and one ventricle: When taken out of the body, it continues to beat for seven or eight minutes, or even for several hours according to the observations of Baron Haller. The motion of the blood is irregular, being propelled drop by drop, and at unequal intervals; and in the younger animals, the mouth and eyes are opened and shut every time the heart beats. The two lobes of the lungs are composed of a great many membranous cells similar in

in some degree to the cells of a honey-comb *; and the animal has the power of keeping them distended for a considerable time, so as to render its body specifically lighter than water.

Edible
Frog.

The vivacity of this animal, and the superiority of its instincts over those of such oviparous quadrupeds as resemble it most, in spite of the smallness of its size, proceeds in all probability from its being better provided with external senses. The eyes are large and prominent; and its skin, which is soft and destitute of scales or bony shields, is continually lubricated and kept pliable by a viscid liquor which oozes through its pores: Hence it is endowed with delicate sensibility of touch, and with very acute sense of vision. And, though the ears are covered over by a membrane, they are provided in their internal organization with an elastic chord, which may be tightened at pleasure, and which must necessarily communicate very delicate perception of sounds.

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* Ray, Synopf. Animal. 247.

Edible
Frog.

In consequence of this superior degree of delicacy in the organs of sensation, frogs are extremely nice in their choice of food, and reject every thing which is, or appears to be, beginning to corrupt. Thus, though they feed on leeches, small snails, beetles, and other insects, both with and without wings, they never take any unless they can perceive them to move*. They remain motionless, waiting till the worm or insect comes within reach, then spring towards it with agility, often leaping a foot or two in height, and dart out their tongue, which is smeared over with so tenacious a glue, that when once it touches an insect it can never escape. They likewise swallow small snails quite whole†, the esophagus or gullet being very extensible; and their stomachs are very large, and capable of receiving a great quantity of food at one time; owing to which, and the activity of their sensations, they have a very voracious appetite. They do

* Laurenti, Specimen Medicum. 137. Bomare, Dict. of Nat. Hist. article Grenouille.

† Ray, Synops. Animal. 251.

do not confine themselves to the articles of food just enumerated, but sometimes swallow pretty large animals of other kinds entire, such as young mice, small birds, and even newly hatched ducks, when they can surprise these at the surface of the water.

Edible
Frog.

This species very often comes out of the water, both in search of food, and to bask in the sun. Instead of being almost dumb, like many of the oviparous quadrupeds, particularly the salamander, with which it has many analogies, the edible frog has a very loud voice, which is heard from a considerable distance, particularly in the night. This cry begins in the early part of spring, as soon as the fine weather sets in. There seems some connection, either of pain or pleasure, between frogs and dampness; for they are said to croak louder before rain, and thereby to foretel the approach of damp or rainy weather.

The croaking of frogs is composed of hoarse, discordant, and indistinct sounds; even that of a single individual is sufficiently unpleasant; but they are generally heard
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Edible
Frog.

in considerable numbers, forming, when near, a most disagreeable jarring of harsh monotonous sounds, fatiguing even to the least delicate ears. The males make the loudest noise ; blowing up a kind of pouch or air-bag at each side of the throat, which serves to increase the power of their voice : The croak of the female is only a dull hollow grunt, which she forms merely by swelling out the throat. The croak of the males is only louder, and heard to a greater distance, than that of the females, without being in the least degree more agreeable. Nature has not formed these animals as musicians to our fields, having only provided them with instruments of forcible, not of pleasing sounds. If the frogs are to enjoy a distinguished rank among oviparous quadrupeds, it is not certainly on account of their voice ; for, though they may please by the activity of their motions and the beauty of their colours, they can only produce disgust by the harshness of their croakings. These serve only to interrupt the delightful silence which reigns during
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the fine nights of summer, and to prevent our enjoying the calm tranquillity of the scene, when the gentle light of the moon sheds its pleasing influence on the verdant meadows and the flowery banks of the still running rivulets. In such calm retreats, we might enjoy the cool air of the evening, perfumed by the surrounding flowers, and remain absorbed in pleasing stillness; but the frogs interrupt the wished for repose, and destroy the enchantments of the scene, by grating our ears with their harsh incessant croakings.

Edible
Frog.

Besides the loud, frequent, and prolonged croak, the male has a less unpleasant cry, which is more hollow and somewhat plaintive, and is used as a call for the females; so that, almost in every instance, the expression of love is mixed in some degree with softness. The vesicles formerly mentioned are not only filled with air when the animal croaks, but may be blown up by pressing the body, so as to force the air from the lungs into them; and they swell out in a similar manner, when the animal

Edible
Frog.

is placed beneath the exhausted receiver of an air pump.

Although the edible frog is found in countries of considerably high latitude, heat is so necessary to it, that it loses its agility and quick sensibility, and even becomes torpid on the commencement of the cold of winter; and this torpor generally takes place in some concealed retreat beneath the water, either in marshes or lakes. Some individuals, however, pass the cold season in subterraneous holes; being either surprised in these by such a degree of cold as benumbs them, or they are determined, by some unknown circumstances, to prefer that situation for their season of torpor. During the time of their long hybernation, according to the opinion of Malpighi, they are nourished by means of a fatty substance, situated in the trunk of the vena porta, which supplies the slight waste of their blood and juices. Such individuals of this species as inhabit the warm regions of the earth, not being subjected to any severe degree of cold, must necessarily be freed from
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the hybernating state, in the same manner with the crocodiles and other lizards of the torrid zone.

Edible
Frog.

Frogs may at any time be roused from their torpor, by means of an artificial temperature equal to the natural warmth of spring; and they can be again rendered torpid, by replacing them in a cold temperature. It would appear, however, that this unnatural state of activity, to which they are recalled by artificial warmth, occasions a considerable waste of their vital powers, and causes them to die very soon after: But it is probable, that if frogs brought from a warm country, which had become torpid in a cold one, were restored to activity by artificial means, they would not suffer by the resuscitation, which would only be to them the restoration of their natural state. In some experiments on this subject, M. Gleditsch, of the Prussian Academy, succeeded so far in restoring the natural vigour of frogs from their hybernation, by artificial means, that they even gave indication of the sexual passion, which is produced

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naturally by the fine weather of spring : But, whether from want of proper food, or in consequence of their activity being too suddenly excited at a season when they commonly retain only a very feeble existence, the frogs restored to vigour by that naturalist all quickly perished.

Frogs are subject to the same changes of their skin with other oviparous quadrupeds. Their skin, however, being more pliable, and more constantly steeped in water, by which it is rendered soft, is more liable than that of most other oviparous quadrupeds to be injured by the operation of external causes. They are themselves more voracious, and have the organs connected with nutrition better constructed ; and they use a more abundant and more substantial food than these other animals, which supplies a larger quantity of new juices, so that they form more readily a new skin beneath the old one. Hence they change their skin very frequently, when not torpid, generally throwing off the old skin every eight days. The old skin, after it is entirely separated from

from the body, resembles a thin mucus rather than a membrane.

Edible
Frog.

Like all oviparous quadrupeds, the male frogs begin to seek out their mates at the commencement of the warm weather in spring. At this season a blackish tubercle or wart, covered all over with minute papillæ, grows on the inner toe or thumb of each fore foot of the male *. Linnaeus, probably trusting to the opinion of Frederic Menzies, has been led to suppose this wart to be the male organ †; but, if he had reflected in the least on this subject, he must necessarily have seen the absurdity of the supposition. The real use of this structure seems to be merely to assist in retaining a firm hold of the female: For this purpose, the male mounts on her back, and embraces her so strongly with his fore legs, interlacing the toes of both feet together, that it requires considerable force to separate them; he will even keep his hold af-

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* Roefel, Hist. Ranarum. 54.

† Syst. Nat. ed. xiii. vol. i. p. 355.—This mistaken idea is omitted in the subsequent editions.—T.

Edible
Frog.

ter his hind feet are cut or torn off. Spallanzani even asserts, that, having cut off the head of a frog engaged with a female, it continued for some time to fecundate the eggs, and lived for four hours. In spite of every effort on the part of the female, the male retains his posture; and does not quit it even when she comes out of the water*. This intimate union continues for several days, the longer in proportion as the weather is colder, and does not cease until the female has protruded her whole burden of eggs†; during all which time they swim about together united in the closest embrace. We have formerly had occasion to notice an equally strict union between the male and female tortoises, which float about in the sea for several days so intimately united as to be hardly separable by any force.

After the above union has continued for some days, the female protrudes her eggs, making

* Swammerdam, Hist. de la Grenouille.—Collection academique. v. 549.

† Consult the works of Swammerdam and Roesel.

making occasionally at the same time a low kind of croaking. These eggs are glued together, and covered all over by a glairy fluid, forming a kind of string. At the moment when these eggs are quitting the anus of the female, the male sheds his seminal fluid over them, emitting a peculiar cry at the same time *. This operation is facilitated by the hinder part of the body of the male extending farther back than that of the female. When this business is finished, the male quits his hold; and, though he has remained so long almost without motion, and in a very constrained degree of contraction, he begins immediately to swim about with great agility †.

Edible
Frog.

The eggs of frogs contain a small globule in the center, which is black on one side and whitish on the other; this is surrounded by a transparent gluten, which probably serves as nourishment to the embryo; and the whole is covered by two thin membranes, which serve the same purpose with

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* Laurenti, Specimen Medicum. 138.

† Swammerdam, as cited before.

Edible
Frog.

the shell and its inner membrane in the eggs of birds. Spallanzani considers the inner membrane, which furrounds the tadpole, as analogous to the amnios in viviparous animals; and on that account proposes to separate frogs, tree-frogs, and toads, from the class of oviparous animals, to join them with the viviparous class. But it seems extremely improper to attempt separating these animals from tortoises and lizards, with which they agree in so many particulars, to unite them with a set of animals from which they differ almost in every circumstance, both internal and external.

After a longer or shorter period, according to the temperature of the season, the central globule expands and assumes the form of what is called a tadpole *. When arrived at a certain degree of maturity; it tears the membranes that surround it, and floats in the glairy fluid which connects the eggs with each other. The umbilical chord continues for some time after this attached to the tadpole, being fixed to the head,

* Spallanzani's Essays, iii. 13.

head, instead of the belly as in most other animals. At first it quits the glairy matter occasionally, as if to try its strength, but soon returns, apparently both for the purpose of rest and nourishment.

It continues gradually to increase in size, and the head, breast, belly, and tail, are very soon distinctly visible. The mouth is differently situated in the tadpole from what it is in the adult frog, being placed rather on the breast than in the fore part of the head: From which circumstance, it is obliged to turn on its back when inclined to lay hold of any thing on the surface of the water, or to expire the air from its lungs; and this motion is made so quickly as to require the utmost attention to be able to perceive it. About fifteen days after the exclusion of the eggs, the eyes continue still closed; but the rudiments of the hind feet begin to appear, and gradually force themselves through the skin, which extends along with them. The places of the toes begin to show themselves by the appearance of minute buttons; and,

Edible
Frog.

though no bones can yet be seen, the form of the foot becomes very distinct. In general the fore feet are last of appearing, and grow in the same gradual manner with the others; but sometimes the fore feet are first formed*.

It is generally two months from the first beginning of their developement, before the tadpoles throw off their first covering to assume the real form of frogs. The tadpole skin first splits or tears open on the back near the head, which part issues through the opening. That part which formerly served as the mouth is pushed backwards along with the casting skin. The fore legs get out from their confinement; then the body, the hind legs, and the tail. This last continues to exist for some time after the animal has become a perfect frog; but gradually diminishes in size, and at last disappears altogether. Pliny, Rondeletius, and some other naturalists, have fancied that the tail of the tadpole became divided in two, to form the hind legs

* Swammerdam, Hist. des Grenouilles. 790.

legs of the frog ; but that opinion is contrary to the most accurate and attentive observations.

Edible
Frog.

This mode of developement is almost exactly the same in all oviparous quadrupeds without tails : And however different it may appear, at first sight, from that of the other oviparous quadrupeds, when attentively examined, these differences may be reduced to two circumstances. In the first place, the embryo or tadpole quits the egg much sooner than most other oviparous quadrupeds ; even before all its parts and members are completely formed, and before either bones or cartilages seem to exist. In the second place, this half formed embryo is inclosed by a particular membrane, or a species of second egg, extremely pliable and transparent, with which it has a communication through which it is supplied with food. The former of these circumstances may be considered as only a slight degree of difference, or merely as a shortening of the time necessary for the first operations, in the developement of those animals

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Edible
Frog.

animals which are produced from eggs. And this mode of proceeding may very readily be conceived as taking place without injury to the tender embryo, since it has need neither of strength nor of members for those movements that are needed in the water which it inhabits; and besides the transparent gelatinous fluid from which it readily procures nourishment is congenial with the feeble nature of its organs.

The bag, or membrane, in which the embryos of all the tailless oviparous quadrupeds are contained during the first period of their tadpole state, has an opening through which nourishment is conveyed to the young animal, and may be considered as a kind of second egg, or more properly a second covering, from which the animal never gets out until it acquires the use of all its members, and then only it may really be said that it is hatched: For it may be considered as still within the egg so long as it retains the tadpole form, since that second egg or membrane remains to form the first skin of the young animal.

This

This bag is furnished with a perforation, because it does not itself contain nourishment for the embryo, which is therefore under the necessity of searching for food, either in the water, or in the glairy matter, which floats in the water like a cloud. The tadpole may therefore be considered as a soft pliable egg, which gives way to all the necessary motions of the included embryo. The same thing would take place in all eggs, even in those of our domestic fowls, if, instead of being covered by a solid calcareous shell, they were only enveloped in a soft, flexible, and transparent membrane. The included chick would then be capable of moving in some degree within its membranous covering, which would yield to its motions ; and this would the more readily take place, if, instead of being opposed by the roughness and inequalities of the ground, they were situated in the middle of water, which would sustain the egg and its inclosed inhabitant, without giving much resistance to their movements. The chick

Edible
Frog.

would

Edible
Frog.

would then be exactly in the situation of an animal that is inclosed in a flexible bag.

The eggs of all oviparous quadrupeds without tails have several membranous coverings. The more external of these continues entire only for a few days. The innermost, which is very soft and pliable, remains for a long time as the outer skin of the tadpole: It yields to all the motions of that little animal, and extends along with it as its size increases: It is perforated by an opening, which is rather improperly named the mouth of the tadpole, as it can scarcely be considered as a particular organ, but merely as a passage for the nourishment necessary to the young animal. As the eggs of all the animals of this class are usually layed in water, which in spring and summer is colder than the earth or the atmosphere, they experience less warmth than those of lizards and tortoises, which are deposited on the shores of the sea and of fresh waters, or other situations proper for exposing them to considerable influence of the suns rays: Hence, we are
not

not to be surpris'd that the young frogs should continue so long within their eggs or membranes, generally for near two months, when only they can be said to be hatched, on quitting the tadpole form ; while the young of tortoises and lizards, being animated by a much superior warmth, are completely hatched to the perfect state in a very small number of days.

Edible
Frog.

The tails of tadpoles, not being strengthened by bones, must very readily be injured by the action which it exerts in swimming and by the resistance which it meets with from the water ; which circumstance may very naturally be supposed sufficient to account of its obliteration*. This tendency of nature to give tails to frogs and the other congeneric animals, as she has
more

* These mechanical ideas, and the preceeding attempts to support an exact resemblance and analogy between the eggs of oviparous quadrupeds without tails, and those of birds, tortoises, and lizards, are certainly extremely unphilosophical ; but it is not the province of a translator to correct or confute the theory of his author.—T.

Edible
Frog.

more effectually accomplished in lizards and tortoises, is an additional proof of the analogies which subsist among the whole class of oviparous quadrupeds, and shows that they are in a great degree formed on the same model.

The colours of the edible frog become less vivid after the breeding season; becoming frequently after that period so dusky and so much on a brown hue, as to have given occasion for many to conceive that they are metamorphosed into toads during summer.

Frogs are extremely tenacious of life, so that they can suffer very severe wounds without being materially injured: They will even live and move about as usual for some time after the body has been laid open, and the bowels and even the heart taken out. Their life and motion even continues after they have lost the whole of their circulating fluids: And, if in this state, they be exposed to a severe degree of cold, they will become torpid; and will again recover their agility by
means

means of warmth *. Hence, notwithstanding the numerous dangers to which they are exposed, their life must in general be long in proportion to the size of their bodies.

Edible
Frog.

Being accustomed to remain often for a considerable space of time under water, and their hearts being able to continue to beat without the assistance of respiration, it is not surprising that they are likewise able to live for some time under an exhausted receiver †. We may even suppose, that the uneasiness and pain they experience, on beginning to exhaust the air pump, proceeds more from the sudden and forcible expansion of their vessels, by the rarefaction of the air continued in their bodies, than from the want of fresh external air. Hence toads, frogs, and asks, are capable of living longer than most other animals, in close vessels, where the air cannot be renewed.

Frogs

* See on this subject, the works of Ray, Haller, and Spallanzani.

† See the works of Redi, and Nollôts *Leçons de physique expérimentale*.

Edible
Frog.

Frogs are preyed on by fish of various kinds, particularly by pikes, eels, water serpents, and by moles, weasels, wolves, water fowl, birds of prey, and many other animals. They are even much sought after by mankind, especially the present species, as furnishing an useful article of food; certain parts of their bodies being even considered as a delicacy. For this purpose they are caught in various ways: Sometimes by means of nets in the night, using torches which dazzle or terrify them so much as to make them almost motionless: Or they are caught by means of hooks, baited with worms, insects, flesh, or even a bit of red cloth; for, being very voracious, they seize every thing greedily, and keep their hold very obstinately. In Switzerland, they are caught by means of large rakes, with long close set teeth, which are thrown into the water and drawn out again suddenly*.

Different parts of their bodies, and even their spawn, variously prepared, has long been

* Laurenti, and Bomares Dictionary.

been considered as a useful remedy in some diseases *.

Edible
Frog.

This edible species is found almost in every country of the world; inhabiting as far north even as Swedish Lapland. In Carolina and Virginia they are said to be very numerous, and so extremely active as sometimes to clear fifteen or eighteen feet at one leap.

Having extended our account of the edible frog to a considerable length, we shall only give a cursory view of the other species, as their natural history and habits are all very similar to the one now described. These shall be treated of as distinct species; though, perhaps, more accurate investigations may hereafter show that they ought only to be considered as varieties, or at least as permanent races †. In our account
of

* Bomares Dictionary, article Grenouille.

† This notion of permanent races or varieties, as contradistinguished from real species, which so frequently occurs in the French naturalists, seems more ingenious than real. Formal system is the work of art, and is highly useful for studying the productions of Na-

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Edible
Frog.

of these we shall confine ourselves chiefly to the differences between their form and habits and those of the edible frog, and the characters by which they may be distinguished from each other.

ART. II. THE COMMON FROG*.

Common
Frog.

THIS species is very readily distinguishable from all other frogs, by means of a large black spot or blotch on each side, from

ture: But the system of Natures arrangement, in forming the various links of the great scale of being, are, yet at least, almost totally unknown.—T.

* La Rouffe, la Muette. Encyclop. Method: 170.

Rana temporaria: Having a flattish and slightly angular body. Syst. Nat. ed. Gmel. i. 1053. G. 120. sp. 14. It. oel. 154. Faun. suec. 278. Id. i. 250. Wulff. Ichthyol. &c. boruss.

Rana muta. Laur. amphib. 30. n. 17.—*Rana fusca* terrestris. Roesel; Hist. tranar. t. 1. 2. 3.—*Rana*. Aldr. ovip. 89. Johnst. quadr. t. 75. f. 5. 8. Bradl. natur. t. 21. f. 1.—*Rana aquatica*. Raj. quadr. 241.—*Rana aquatica innoxia*. Gesner, aq. 805. Ib. ovip. 46.—*Batrachos*. Arist. Hist. nat. Lib. iv. ch. 9.—Common Frog. Brit. Zool. iii. 9. n. 2.

Var. β . *Rana gigas*. S. G. Gmel. It. 3.

from near the eye to the root of the fore leg. At first sight it seems only a variety of the edible species; but, as both are found in the same countries, and even frequently inhabit the same pools, and as they differ from each other both in habits and colours, we cannot refer the differential characters to any different effects of climate or temperature, and must therefore consider them as separate species. In the common frog the upper part of the body is of a dusky reddish brown colour, becoming lighter for some time after casting the skin, and growing somewhat marbled or clouded towards the middle of summer. The belly is white with black spots, which increase in number with the age of the individual. The thighs are streaked with brown. The tip of the tongue is notched, and by means of the two edges of the notch is able to take hold of insects; these are still farther secured by means of a viscid or glutinous fluid with which the tongue is smeared over. This species, like most others, catch insects

Common
Frog: 2017

by a sudden dart of the tongue, whenever they are within reach.

This species has been called the silent frog *, in consequence of its voice being much less frequently heard, and neither so loud or so harsh, as that of the edible frog, whose frequent loud and disagreeable croakings are heard to a great distance. In the breeding season, however, or when teased, this frog emits a dull cry or murmur, which is more frequently repeated and louder in the male than in the female. It spends most of the fine season of the year on the land; returning to the marshes about the end of autumn, and burries itself in the mud at the bottom of pools of water whenever the cold becomes severe, remaining in that situation completely torpid till the return of spring. Immediately on the return of warmth, it quits the state of hibernation, being restored to all its activity. The younger individuals go directly on land, in search of food; and those which are three or four years of age, having attained

* La Muette, or *Rana muta*.

tained sufficient maturity for reproducing the species, continue in the water till the season of breeding is over; the male and female remaining nearly four days in close embrace. This is the first of the genus to quit the wintry torpor, and the first to reproduce its kind.

The common frog undergoes the same changes of form with the former species; but it appears to require a longer time for that purpose, and is supposed not to acquire the perfect form of a frog until about three months old. About the end of July, when they are completely formed, and have entirely laid aside the tadpole shape, the young ones quit the water, and set off to join the older frogs of their species in the woods and meadows. They begin their journey in the evening, travelling all night, and purpose to avoid becoming the prey of rapacious birds; always concealing themselves during the day under stones or other recesses, and only resume their journey when night begins. But, in spite of all this seeming prudence, they come always out of

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Common
Frog.

their retreats whenever it rains, as if to so-
lace themselves in the falling moisture.

Being extremely fruitful, the females
laying each from six to eleven hundred
eggs every season, it is not surprising that
they should be sometimes found in such
vast multitudes, particularly in woods and
wet soils, that the whole ground seems a-
live. The immense multitudes, which are
sometimes seen coming out of their holes
immediately after rain, and the suddenness
with which they again disappear on the re-
turn of sun shine, have given occasion for
two very absurd vulgar opinions, which
have even been adopted by some authors
who ought to have reasoned better. These
are, that frogs sometimes fall from the clouds,
or that they are engendered suddenly by
the mixture of the drops of rain with dust;
and the consequence of these strange no-
tions was, that they became annihilated as
suddenly whenever the sun regained its in-
fluence. The smallest degree of philoso-
phic investigation would have led to a dis-
covery of the truth; by finding them con-
cealed

cealed under stones and other places of shelter before the rain, and by finding them again retired to the same shelter, on the return of sun shine, to avoid the too powerful influence of the heat and light. But this would have left two fables fewer to be related, and the only merit of many pretended philosophers vanishes with the exposure of such marvellous facts.

Common
Frog.

It has been pretended that this species is poisonous, but it is eaten in some parts of Germany. Laurenti caused a small nimble lizard to bite a common frog; but, though that animal is known to be extremely susceptible of injury from the weakest poison, it did not suffer the smallest inconvenience*. The common frog is very numerous in Sardinia†, and in almost every country of Europe.

The animal named land frog by Catesby‡, which inhabits Virginia and Carolina,

P 4

seems

* Specimen medicum, p. 134.

† Hist. nat. amphib. & pisc. Sard.

‡ Nat. Hist. of Carol. ii. 69. Lawson, Carol. 132.—

On

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Common
Frog.

seems to be of this species. 'The back and upper parts of the body are grey, with dusky brown spots very closely set; the belly is dirty white, with slight spots; the iris is red. The colour is subject to variety; some individuals being more on the grey, and others brownish. The body is thick, having more resemblance to a toad than a frog: It leaps, however, like a frog, and does not crawl like a toad. It is most seen during rainy weather, and in the hottest time of the day; being very common in elevated situations.'

According to the highly respectable authority of Mr Pennant, in the supplement to his excellent work the Arctic Zoology, we are inclined to consider the land frog of Catesby as a different species. Mr Pennant describes it as follows.

Land frog: Grey or brown above with dusky spots, and white with faint spots underneath; having red irides, short legs, and the appearance of a toad. Supp. to the Arct. Zool. p. 82. n. 12.

It frequents the high lands, being seen most in wet weather and in the hottest time of the day, and feeds on insects, particularly the fire-fly. Is used as a remedy for tympany by the Americans; baked, reduced to powder, and mixed with orrice root.—T.

According to Catesby, it prefers as food those insects which shine in the dark; either because such nourishment is most congenial with its nature, or because such insects are more easily seen and caught during the night. At one time, when that author happened to be out of doors, in a very warm evening, a person in company let fall some burning tobacco from his pipe, which was instantly swallowed by a land frog squatting close by. Catesby offered a little bit of lighted charcoal to the animal, which it swallowed immediately; and he found, on repeated trials, that the land frog constantly swallowed whatever burning substances came within its reach.

Common
Frog.

ART. III. *THE NATTER-JACK*.*

THIS species is distinguished from other frogs, by having the upper parts of its body covered with warts or porous pimples.

Natter-
jack.

The

* La Pluviale. Encyclop. Method.

Rana rubeta: Having a tumid warty body, the hind parts

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Natter-
jack.

The hinder part of the body is blunt, and scattered underneath with small points. The fore feet have each four divided toes, and the hind feet five, which are slightly webbed.

The upper part of the body is dirty yellow clouded with brown, and covered with porous pimples of unequal sizes, the back having a longitudinal yellow line. The under parts are paler than the upper, and marked with black spots, which are rather rough. The length of an individual of this species, measured by Sir Joseph Banks, was two inches and a quarter; the breadth one inch and a quarter; the fore legs measured one inch and a sixth part in length, and the hind legs two inches. This species neither leaps like other frogs, nor does it crawl like toads,

parts being obtuse, and punctuated underneath. Syst. Nat. ed. Gmel. i. 1047. G. 120. sp. 4. Faun. suec. 276. It. W. goth. 261. Wulff. Ichthyol. borufs.—Natter-jack. Brit. Zool. iii. 18. n. 5.

Linnaeus places this species among toads; adding, that it resembles the young of the common toad, and suspects that it ought not to be considered as a distinct species.—T.

toads, but its motions are a kind of running, like a lizard *. Natter-jack.

The natter-jack is found in several parts of Europe †, making its appearance often in large numbers after showers in spring and summer; from which circumstance the same ridiculous story, of its dropping from the clouds, has been told of this species that we have noticed in treating of the former.

ART. IV. *THE RINGING FROG* ‡.

THIS species, which is found in Switzerland, Germany, and the north, has some resemblance to the toad; and, as it Ringing Frog. chiefly

* This description is added from Pennants British Zoology.—T.

† It is found on Putney Common, and in Lincolnshire; frequenting dry sandy places, and appears most-ly in the evenings. Brit. Zool.—T.

‡ La Sonante. Encyclop. Method.

Rana bombina: With a warty body; and having a transverse fold of the skin on the throat. Syst. Nat. ed.

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Ringing
Frog.

chiefly inhabits the marshes, has been frequently named the marsh toad. It leaps, however, like a frog, and is considerably smaller than the toad. The principal mark which characterises this species from the rest, is a transverse fold of the skin on the throat. The upper part of the body is warty,

ed. Gmel. * i. 1048. G. 120. sp. 6. *Rana variegata*. Syft. Nat. ed. x. 211. Wulff. Ichthyol. boruf.—*Rana campanifona*. Laurent. amphib. 30. n. 18.

Var. α. Having an orange belly, with bluish grey spots, and three cornered pupils. Blumenb. Natur. 260. n. 5.—*Bufo igneus*. Roefel. Hist. ran. f. 22. 23. Laur. amph. 29. n. 13.

β. Having a whitish belly, with black spots. Syft. Nat. ed. xii. 355. n. 6. Faun. suec.

277. γ. Having a black belly, with bright white spots and minute dots. Laur. amph. 29. n.

13. δ. Being somewhat smooth, with many brown spots, having whitish intervals, the joints being reddish. Laur. amph. 28. n. 10. Roefel.

Hist. ran. f. 17. 18. *Bufo fuscus*.

* The character in Gmelin's edition of the Syft. Nat. is rather that of a variety than of a species, and is therefore here restored to the Linnaean or xiii. edition.

warty, and is generally black; the under parts being variegated. The fore feet have each four divided toes, and the hind feet five, which are united by membranes*. The specific name is derived from its voice, which is clear, loud, and ringing, and has been supposed to have some resemblance to the ring of a bell heard from a considerable distance.

Ringed
Frog.

ART. V. THE EDGED FROG †.

THIS species inhabits India and South America. It is easily distinguished from all others, by having an edge or border along each side. The body is longish, being brown, and smooth on the upper parts,

Edged
Frog.

* By the engraving, though that circumstance is not mentioned in the text, all the toes of the hind feet have long sharp hooked claws.—T.

† La Bordée. Encyclop. Method.

Rana marginata: Having a long smooth body; with edged sides; and divided feet. Syst. Nat. ed. Gmel. i. 1053. G. 120. sp. 12. Mus. ad. Frid. 47*. Laurent. amphib.

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Edged
Frog.

parts, and pale, with a great number of small warts or pimples, on the under parts. Laurenti says that the upper parts are warty; but we have rather chosen to follow the description given by Linnaeus, from a specimen in the museum of Prince Adolphus. The hind legs are long, and have five divided toes on each.

ART. VI. THE VEINED FROG*.

Veined
Frog.

THIS species is found in the same countries with the former; and is distinguished by having a number of confluent spots, and ramified streaks crossing each other like net-work. The legs are longish, resembling those of frogs, and the toes of the hind feet are divided from each other.

ART.

* La Reticulaie. Encyclop. Method.

Rana venulosa: Having a long smooth body, with spots and streaks crossing like net-work; the feet being divided. Syft. Nat. ed. Gmel. i. 1053. G. 120. sp. 32. Seba, Mus. i. t. 72. f. 4. Laurent. amph. 31. n. 22. disj.

ART. VII. THE DUCK-FOOTED FROG*.

THIS species is found in Virginia; and is principally distinguished from all other frogs, by having the toes, both on the hind and fore feet, united by webs or membranes. It is of very considerable size, and very elegantly variegated with ramified streaks like the former species. The legs and feet are ornamented with pairs of coloured stripes, which run together on the thighs. The upper part of the back is marked with oblique rows of spots. We are not acquainted with its natural history; but the conformation of its feet gives reason to presume that it lives very much in the water.

Duck-footed Frog.

ART.

* La Patte-d'oie: Encyclop. Method.

Rana maxima: Having a longish smooth body; all the feet being webbed. Syst. Nat. ed. Gmel. i. 1053. G. 120. sp. 30. Seb. Mus. i. t. 72. f. 3. Laurent. amphib. 32. n. 24.

ART. VIII. *THE SHOULDER-KNOT FROG* *.Shoulder-
knotFrog.

THIS species is very large, being sometimes eight inches in length. It is particularly distinguished by a kind of smooth oval protuberance on each shoulder, of a light ash colour dotted with black; from which circumstance the trivial name in French and English is derived. The head is streaked with reddish brown; having large brilliant eyes, and a large tongue. The whole body is yellowish grey or ash colour, spotted with brownish or yellowish grey, more bright than the ground colour, and

* L'Epaule-armée. Encyclop. Method.

Rana marina: Having a warty body, with a projection on each shoulder; the eyebrows being warty; and the hind feet slightly webbed. Syft. Nat. ed. Gmel. i. 1049. G. 120. sp. 8. Laurent. amphib. n. 21. Seba, Mus. i. t. 76. f. 1 — Meer-frosch. Wallbaum, Schr. der Naturf. Berl. gef. v. 230.

Var. β . Yellowish-white, spotted above with brown, and clouded with livid underneath; the scrag and shoulders being spotted with grey. Wallb. Schr. &c. v. 241.

and is covered with numerous elevated pimples of different sizes, which are chestnut coloured at their tips. The back is very much angular; the hinder part of the body, about the anus, being marked by four fleshy excrescences, like large warts or buttons; and the anus is surrounded by radiated wrinkles. The fore feet have each four divided toes, armed with claws; and the hind feet have five toes on each, which are edged by chestnut coloured webs towards their extremities, the lower joints only being connected together.

This species seems, by its conformation, to be fitted for living both on land and in the water, like the common frog. The trivial name *marina*, or the sea frog, given by Seba, and adopted by Linnæus and Laurenti, seems to indicate that it lives near the shore, and even in the sea; but, as all other oviparous quadrupeds without tails are confined to the land and to fresh water, this is probably founded on misinformation.

Shoulder-
knot Frog.

ART. IX. THE BULL FROG *.

Bull Frog.

THIS species is found in Virginia, but not in such numbers as the other kinds of frogs which inhabit that country. The eyes are large, oval, protuberant, and very bright; having dusky red irides, surrounded

* La Mugiffante, ou Grenouille Taureau. Encyclop. Method.

Rana ocellata: With a long smooth body; having an eye-like spot at each ear, and several such on the sides; the toes having no claws. Syft. Nat. ed. Gmel. i. 1052. G. 120. sp. 10. Mus. ad. frid. ii. 39 *. Brown, Jam. 466. t. 41. f. 4. Seba, Mus. i. t. 75. f. 1.—Bull frog. Catesby, Carol. ii. t. 72. Lawfon. 152. Arct. zool. supp 80. n. 9.

Rana pentadactyla: All the feet having five toes. Laur. amphib. 32. n. 23. Syft. Nat. ed. Gmel. i. 1052. G. 120. sp. 27.

Var. β . Having four toes, with the rudiments of a fifth, on each fore foot, and five, with the rudiments of a sixth, on each hind foot. Laur. amph. 32. n. 23. β .

By misquoting Seba, t. 76. instead of 75. in the Syft. Nat. the *R. ocellata* and *R. pentadactyla* have been made different species, when they are in reality the same.



Archer. Sculp.





Archer. Sculp.†

1. Hunched Toad. 2 Grooved lipped. p. 325.

ed by a yellow circle ; and behind each eye the membrane covering the ear is round and eye-like. The whole upper parts of the body are deep brown, spotted with darker brown or blackish, and mixed with tints of yellowish green : The spots on the back are arranged transversely, and those on the sides are round, giving an ocellated or eye-like appearance. The belly is dirty white, with a yellowish tinge, and slightly spotted. The feet, both before and behind, have five toes, with a tubercle under each joint ; sometimes the fifth toe on the fore foot is only a small tubercle, like the rudiment or remains of a toe ; and in some individuals the hind feet have each a similar projection, as if the rudiment of a sixth. The toes of the hind feet are somewhat webbed ; and all the toes are destitute of claws.

Bull Frog.

The bull frogs sit commonly in pairs at the side of small rills or springs, in hilly places, close to the hole from which the water runs ; and, when disturbed, they leap directly into the mouth of the spring, and

Bull Frog. conceal themselves at the bottom of the water. The Virginians, however, hardly ever destroy them; as they have an opinion that the bull frogs purify the water, and preserve the springs from growing foul. This idea may have been originally founded on their destroying insects, worms, &c.; but, like many other opinions of the ignorant, has degenerated into a kind of superstitious veneration, insomuch that they would dread some misfortune after killing one of these animals. Interest, however, often gets the better of fear; and accordingly, such as breed geese and ducks, are at pains to destroy the bull frogs in their neighbourhood; for, being extremely voracious, and having a very large mouth, they are very destructive to young water fowls*.

This frog grows to a great size; and its croak is extremely loud, having some resemblance to the bellow of an enraged bull; from which circumstance the trivial names in French and English are derived. Smith, in his travels through the United States of North

* Catfishy, Nat. Hist. of Carolina. ii. 72.

North America, says that the voice of the Bull Frog. bull frog is harsh, loud, and sudden; and that travellers are often alarmed at the half articulated bellow, not being able to discover from whence it proceeds, as the frog, concealing its whole body under water, only keeps its mouth above the surface.

This species, which Laurenti calls the five-toed frog, includes a variety which is very easily distinguished. It is of a brown colour; having a fifth toe on each fore foot, and a sixth on each hind foot; but these additional toes are extremely small. There is a specimen in the Royal Cabinet, which very much resembles that variety. The body is spotted. The supplementary toes are so minute as to be hardly visible. All the toes, both before and behind, are separated, and have tubercles under all their joints. The muzzle is round. The eyes are large and protuberant; and the openings of the ears are of considerable size. The tongue is large and flat, its tip being fastened to the fore part of the lower jaw. It measures six inches and a quarter from

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Bull Frog. the muzzle to the anus ; the fore legs are four inches long, the hind legs six, and the mouth measures above three inches and a half in circumference.

ART. X. *THE PEARLY FROG* *.

Pearly Frog.

THE trivial name of this frog, which inhabits Brasil, is derived from the circumstance of its body being strewed all over with small grains or tubercles of a pale red colour, resembling pearls. The head is triangular, and has some resemblance to that of the chameleon. The ground colour of the back is reddish brown. The sides are spotted with yellow. The belly is whitish, with pale blue tubercles. The feet are destitute

* La Perlée. Encyclop. Method.

Rana margaritifera: Of a reddish brown colour, strewed over with small pale red grains. Syst. Nat. ed. Gmel. i. 1050. G. 120. sp. 22. Laurent: amphib. 30. n. 15. Seba, Mus. i. t. 71. f. 6. 7.

Var. β . Of a pale yellow colour, with red grains; having five toes on each fore foot. Seb. Mus. i. t. 71. f. 8.

titute of webs, having only four toes before. Seba describes a variety of this species, of a pale yellow colour, and having five toes on each fore foot.

Pearly
Frog.

From the beauty of this species, it appears that Nature has been very liberal in ornamenting the oviparous quadrupeds of South America, which at first sight one would be led to suppose she had neglected, in favour of those numerous flocks of various birds, on the plumage of which she has lavished the most brilliant and varied colours.

ART. XI. *THE JACKIE* *.

THIS species is found in great abundance in Surinam. The colour is greenish yellow, darker in some individuals,

Jackie.

Q 4

duals,

* La Jackie. Encyclop. Method.—This name, probably given by the British settlers at Surinam, is here retained, to avoid the multiplication of terms.—T.

Rana paradoxa: The hind thighs being obliquely striated. Syft. Nat. ed. Gmel. i. 1055. G. 120. sp. 13. Mus. ad. frid. ii. 40 *.

Lacerta

Jackie, duals, the back and sides being spotted. The belly is pale and clouded. The fore feet have each four divided toes, the hind feet having five webbed toes on each. The hind thighs are obliquely streaked.

This frog has become famous, in consequence of Mad. Merians story, that its metamorphosis is opposite to the usual mode of other frogs; pretending, that as it arrives at maturity, the hind legs gradually disappear, a tail grows in their place, and it is changed into a fish; thus finishing by the tadpole state, where other frogs begin. This process is so extremely improbable, that it is only mentioned here on purpose to point out the particular species which is described by that learned female naturalist. There are many specimens of this species in the Royal Cabinet, and in almost every other collection in Europe, which all distinctly show its

Lacerta cauda ancipiti. Syst. Nat. ed. vi. 36. n. 2.
—*Rana piscis.* Mus. ad. frid. i. 49.—*Proteus raninus.*
Merian, Surin. t. 71. Seba, Mus. i. t. 78. Laur. amph.
36. n. 34.

its regular change from the state of tadpole to that of a perfect frog, instead of the above pretended metamorphosis of a frog into a fish. When in the state of tadpole, it is of considerable size; and has more or less resemblance to a fish, like all other tadpoles. It would appear, that there is a particular species of fish which has considerable resemblance to the tadpole of the jackie; which circumstance may have contributed to give rise to the idea of that frog being converted into a fish.

Jackie.

ART. XII. *THE LACED FROG* *.

THIS species inhabits America, from which it was transmitted to Linnaeus by M. Rolander. The back is marked by four longitudinal wrinkles, and interspersed with black spots and elevated points. The fore feet have each four divided toes. The hind

Laced
Frog.

* La Galonée. Encyclop. Method.

Rana typhonia: Having oval projecting ears. Syst. Nat. ed. Gmel. i. 1052. G. 120. sp. 9.

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Laced
Frog.

hind feet have five webbed toes on each, the second toe being very long, and all the toes are destitute of the round claws usually found on the toes of frogs.

The frog described by Laurenti, under the name of Virginian frog *, seems only a variety of this species. The upper parts of the body are ash-coloured, with red spots; having five longitudinal ridges on the back, the intervals between which are paler than the rest. The belly and limbs are yellowish.

ART. XIII. *THE SCALY FROG* †.

Scaly
Frog.

THE first account of this singular species was given by M. Wallbaum, in the Memoirs of the Cultivators of Natural History

* *Rana virginica* : Having a five-cornered back, with five longitudinal wrinkles. Syft. Nat. ed. Gmel. i. 1053. G. 120. sp. 33. Laur. amph. 31. n. 20. Seb. Mus. i. t. 75. f. 4.

† *Rana squamigera* : Having a semicircular band of scales on the back. Syft. Nat. ed. Gmel. i. 1055. G. 120. sp. 35. Wallbaum, Schr. der Berl. Naturf. Gef. v. 221.

History at Berlin for the year 1784. It is an extremely curious instance of those remarkable connections by which the different orders of animals are insensibly linked together. We have already seen that almost all the species of the lizard tribe are covered by scales, more or less distinct in different species; while, in the whole order of oviparous animals without tails, this is the only species in which there is the smallest appearance of scales. In the lizard tribe we had another example of this connection of animals of different kinds; the salamander, the ask, and other analogous species, approaching to the present order, by their habits and internal structure, by their want of scales, and by their intermediate state of tadpoles and manner of generation.

The country of this frog is unknown; only one individual having appeared, which was discovered accidentally by M. Wallbaum, preserved in spirits in a collection of natural history. The subject is curious, and deserves attention, that we may be able to compare the habits of this species with those

Scaly
Frog.

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Scaly
Frog.

those of lizards and frogs, and observe whether there is any connection of habits, as there is in form.

The scaly frog is about the size of the edible species, and resembles it in form, being two inches and three quarters in length. The skin is wrinkled on the sides, and under the throat. The fore feet have each four toes, which are webbed at the roots; and the hind feet have each five webbed toes; all the toes having flat claws. Its peculiar character is formed by a band or stripe of scales, which begins on each side at the flanks, and, passing obliquely along the sides, goes over the shoulders, and surrounds the fore part of the back. This band is composed of four rows of small rhomboid scales, which are almost transparent, and lap over each other like tiles; each scale having a slight longitudinal furrow. These scales are precisely similar to those of lizards, and cannot be mistaken for warts or tubercles, like those which occur on a great many frogs and toads. The left hind foot, in the specimen examined by

M.

M. Wallbaum, had a few longish four-sided scales; the other hind foot had probably been injured by the spirits. The hinder part of the belly is covered by numerous small tubercles or warts. The colour was grey, variegated with chefnut spots, which on the hinder part of the back were arranged in winding lines.

Scaly
Frog,

II. DIVI-

II. D I V I S I O N.

TREE-FROGS, OR OVIPAROUS QUADRUPEDS WITHOUT TAILS,

Having a small Viscid Pellet under each Toe.*

ART. XIV. THE COMMON TREE-FROG†.

Common
Tree-
frog.

THE common tree-frog, and all the other species and varieties of this division, are very readily distinguishable from frogs,

* In the original, the three divisions of this order are called Grenouilles, Raines, and Crapauds. In the *Systema Naturae*, the genus *Rana* is subdivided into *Ranae*, *Hylae*, and *Bufones*. The English language having no word for the second of these divisions, we have adopted the term Tree-frog, which indicates the peculiar habits of the different species, in opposition to those of frogs and toads, which always remain on the ground or in the water.

† La Raine verte, ou commune; Βατραχος δρυοπιτης.
Encyclop. Method.

Rana

frogs, by the viscid pellets on the under surfaces of their toes, by means of which they are enabled to fix themselves to the branches and leaves of trees. All the circumstances of instinct, activity, and nimbleness, which have been attributed to the species of frogs, are found in an increased degree in the animals of this division. Being always smaller than the frogs, the tree-frogs join a greater degree of neatness in their form and appearance to the qualities of the former division.

Common
Tree-
frog.

The

Rana arborea : Having divided toes ; the belly being granulated. Syft. Nat. ed. Gmel. i. 1054. G. 120. sp. 16. Amoen. acad. i. 135. Mus. ad. frid. i. 47. Gronov. Mus. ii. 84. n. 63. Roefel, hist. ran. 37. t. 9. 10. 11. Wulff. Ichthyol. boruf.—*Hyla viridis*. Laurent amphib. 33. n. 26.—*Ranunculus viridis*. Gefn. pisc. 808. Raj. quadr. 251.—Tree-frog. Arct. zool. suppl. 81. n. 11. Catfishy, Carol. ii. 71. Lawson. 132.

A number of varieties are added in the *Systema Naturae*, which are considered as distinct species in this work, contrary to the usual custom of Buffon and his disciples, who seem often over anxious to diminish the number of species, and to institute what they call permanent varieties.—T.

256 OVIPAROUS QUADRUPEDS.

Common
Tree-
frog.

The common tree-frog is of a beautiful green colour on the upper parts of the body, and white underneath. A yellow line, slightly edged with violet, extends on each side of the head and body from the muzzle to the hind feet, and a similar line extends from each side of the upper jaw to each fore foot. The head is short and as broad as the body, being a little narrowed at the muzzle. The jaws are rounded, and the eyes are protuberant. The body is short, almost triangular, very broad towards the head, convex above, and flat underneath; the belly being covered with small tubercles. The fore legs are short, and have four toes on each foot; the hind legs being very long and slender, with five toes on each, having flat rounded claws.

The common tree-frog leaps more nimbly than other frogs, owing to the greater length of its hind legs in proportion to the size of its body. During the warm season, it lives in the woods, keeping mostly on the branches of trees. By means of its glutinous skin, and the viscid pellets with which all its

its toes are furnished, it is enabled to adhere with great firmness to the under surfaces of the smoothest branches, and even on the leaves. Catesby alledges, that it has the power of rendering the under surfaces of its pellets concave, so as to form a kind of vacuum, which makes it adhere more firmly to the branches. The same author reports, that it will clear twelve feet at one leap, which is perhaps rather exaggerated; but it is certainly extremely active.

Common
Tree-
frog.

Whenever the fine weather of spring begins, this animal may be seen leaping about among the branches, after such insects as come within reach, which it catches by means of its glutinous tongue, in the same manner with frogs. In this exercise its motions are almost equally light and nimble with those of birds. Indeed, were it not on account of the disagreeable prejudice which exist against all animals of this order, such is the beauty of the colours of the tree-frog, softening into the fine green of the leaves, and contrasting with the flowers, and such the elegance of its mo-

Common
Tree-
frog.

tions, that it would produce almost equal pleasure to the beholder as the feathered songsters which inhabit the same trees. Its contrivances for concealment and for surprising its prey, the agility with which it springs to the distance of several feet among the smallest branches, and the facility with which it keeps itself safe from any danger of falling, even on the lower surfaces of the smoothest leaves, are really admirable.

The habitation of the tree-frog on the extreme branches of trees, furnishes an additional illustration of the analogies which nature has established among animals that appear of the most distant kinds. We have formerly seen the dragon, guana, basilisk, chameleon, and other lizards, some of which are very large, inhabiting the forests, and climbing on the branches of trees. We have observed the flying lizard, like the flying squirrel, shooting readily to such distances, that its leaps may be mistaken for a kind of flight. The same thing, in some measure, occurs again in the species now
under

under consideration ; which besides is almost as much an aquatic as a land animal. Thus, while we find a kind of frog, the habits of which are so much connected with the water, living on the branches of trees, we may observe, on the other hand, vast numbers of birds, nearly destitute of wings, living almost constantly in the sea, and confined in their motions to swimming and diving in the water.

Common
Tree-
frog.

The developement of tree-frogs is slow, like that of frogs. They remain a long time in the tadpole state, or what may be called the egg ; and do not arrive at sufficient maturity to reproduce until three or four years old. Until then they are almost entirely dumb ; and the males, which, as in almost all animals, have louder voices than the females, hardly emit any cry, as if conscious that it is improper to form the expression of desires which they do not yet feel, or to call for companions, towards whom they are not yet impelled by nature.

The sexual intercourse usually begins about the end of April. For that purpose,

R 2

they

Common
Tree-
frog.

they quit the trees, and return to the water ; either to be in greater safety, and to enjoy less disturbance in the prosecution of their amours ; or, because the water being their original habitation, they prefer the element where they received their existence as the scene of their enjoyments, and as the situation best calculated for the nourishment and security of their young, which they had experienced as such for themselves during the early period of their lives ; or, perhaps, it is because they can only unite together in the water, in the manner that best suits their particular organization. They likewise pass the winter season in a torpid state, either at the bottom of the water, or sunk in the mud of marshy places ; so that their residence in the woods is confined to what may be called their hunting season.

They are found in pools of water about the end of April, or by the beginning of May at farthest ; and, as if they could not quit the branches of trees to which they have been accustomed, even for a short time, or rather, perhaps, because they have need

need of these for procuring such food as is necessary, or best adapted to their perfect state, they always choose marshy pools in woody places. In these situations the males may be heard, with rough and frequently repeated croakings *, still stronger even than those of the edible frogs, calling on the females. Whenever one begins, all that are within hearing join the harsh discordant chorus; and the whole is so loud as to resemble a pack of hounds, and may sometimes be heard during very quiet evenings, especially just before rain, to the distance of near three miles.

Common
Tree-
frog.

They unite in the same manner with frogs. The male and female may be often seen to sink together to the bottom of the water, during their union, and to remain there for a considerable time. The female appears occasionally agitated by convulsive movements, particularly just before the ex-

R. 3

clusion

* Mr Pennant, following Catesby and Lawson, compares it to the *chirp* of a bird. Perhaps that may be their voice while on trees, and the hoarser croak may belong to the season of love in the water.—T.

Common
Tree-
frog.

clusion of her eggs ; and at this time the male may be observed frequently bringing the hinder extremity of his body into contact with the same part of the female, on purpose more conveniently to impregnate the eggs as they come forth. At times the whole burden is extruded in a few hours, but at other times it requires forty-eight hours or even more for that purpose. When this is the case, the male is often exhausted, and quits the female ; after which any eggs that may be protruded are certainly barren.

After the breeding season, the colour of the common tree-frog undergoes several changes : It is at first reddish ; then greyish, spotted with black ; it next changes to blue ; and lastly to green. The throat of the adult male is brown, and becomes swelled out when croaking. The young tree-frogs retain the form of tadpoles for two months after the exclusion of the eggs ; but they no sooner acquire the perfect shape, which fits them for leaping, than they quit the water to inhabit the trees. This species may be very easily preserved alive in houses,

by

by taking care to keep it in a proper degree of temperature, and to supply it with proper food.

Common
Tree-
frog.

As the colour of the tree-frog is subject to vary, according to age, season, climate, &c., and as the green on the upper part of its body is liable to change after death to blue, we are induced to suspect the animal described by Boddaert, under the name of Two-coloured Frog*, to be merely a variety of the common tree-frog. The individual described by Boddaert was in the collection of M. Schlosser, and came from Guinea. The feet were not webbed; having four toes on each fore foot, and five behind; all of which were furnished with viscous pellets. The upper parts of its body were blue, and the under parts yellow.

R 4

The

* *Rana bicolor*: Being blue above, and yellowish underneath. Syst. Nat. ed. Gmel. i. 1052. G. 120. sp. 29. Boddaert, Schr. der Berl. Nat. ii. 459.

In the *Systema Naturae*, this species is placed in the division of frogs, and is said to be larger than most of that kind, neither of which agree with the opinion of our author.—T.

Common
Tree-
frog.

The head was larger than the body; the muzzle being somewhat lengthened, and the upper lip slightly divided.

The common tree-frog is found in Europe, Africa, and America. But, besides that species, there are several others found in foreign countries, which differ considerably from that now described; and which we shall now proceed to give an account of.

ART. XV. *THE HUNCHED TREE-FROG* *.

Hunched
Tree-
frog.

THIS species is found in the island of Lemnos; and is easily distinguishable from other tree-frogs, by means of a very evident hunch on its back. The body is round and smooth. The eyes are prominent. The toes are furnished with viscid pellets, and are united together by webs. It is much preyed on by serpents.

Bombina

A tree-

* La Bossue. Encyclop. Method.

Hyla ranaeformis. Laur. amph. 33. n. 25. Seba, Mus. ii. t. 13. f. 2.

This is considered only as a variety (δ) of the common tree-frog in the *Systema Naturae*.—T.

A tree-frog is found in Surinam, which seems of the same species with this, only varied by the influence of climate, being distinguished by spots on the upper part of its body*.

Hunched
Tree-
frog.

ART. XVI. *THE BROWN TREE-FROG* †.

THIS tree-frog was first described by Laurenti, who does not mention its native country, though it appears to belong to Europe. It is distinguished from the other species of the division by its brown colour, and by the tubercles or pellets on the under surfaces of its toes being in some measure ragged.

Brown
Tree-
frog.

The large tree-frog mentioned by Sloane ‡ as inhabiting Jamaica, may perhaps be only a variety of this species, as it agrees with it in the darkness of its colour; though it is spotted

* *Hyla ranaeformis*, var. β . Laur. amph. Seba, Mus. ii. t. 70. f. 4.

† La Brunc. Encyclop. Method.

Hyla fusca. Laur. amph. 34. n. 27.

‡ *Rana arborea maxima*. Sloane, Nat. Hist. of Jam. ii.

Brown
Tree-
Frog.

spotted with green, and has a conical bag or vesicle at each side of the throat: These differences may only depend on the influence of climate, or on the changes produced in the breeding season, which occasions certain parts of the body in almost all animals to become more remarkable than at other times.

ART. XVII. *THE WHITE TREE-FROG**.

White
Tree-
Frog.

THIS species, which inhabits America, is snow white, with spots of a less lively white, having streaks of pale ash colour on the under part of the belly. The mouth is very large. In a variety of this species the upper parts of the body are bluish, or lead coloured †.

ART.

* *La Couleur-de-lait.* Encyclop. Method.

Rana boans: Having a smooth body, with small contiguous spots on the under part of the body; the feet being webbed. *Syst. nat. ed. Gmel. i. 1055. sp. 17.* *Amoen. acad. i. 285.* *Mus. ad. Frid. i. 47.* *Seba, Mus. i. t. 71. f. 4.*

Hyla laetea. *Laurent. amphib. 34. n. 28.*

† *Syst. nat. ed. Gm. i. 1055. G. 120. sp. 17. var. s.* *Laur. amphib. 34. n. 28. s.*

ART. XVIII. *THE FLUTE TREE-FROG**.

THIS species or variety of the tree-frog is of a snow white colour, according to Laurenti, or, according to Seba, of a yellow colour and spotted with red. The fore feet are webbed. In croaking, the male inflates a vesicle or bag on each side of the throat, which have been compared to *flutes*, whence the trivial name is derived. Seba says, that the croak of this animal is melodious; but one would be apt to suspect the ear cannot be very nice which is pleased with such melody. Contrary to the custom of other frogs, which croak most during rain or immediately before it, the flute tree-frog prognosticates fine weather by its croakings, and is silent during rain and cold weather. Perhaps moisture and dryness may act differently on the feelings

Flute
Tree-
Frog.

* La Fluteuse. Encyclop. Method.

Hyla tibiatrix. Laurent. amphib. 34. n. 30. Seba, Mus. i. t. 71. f. 1. 2. Syst. nat. ed. Gmel. i. 1054. G. 120. sp. 16. var. 7.

Flute
Tree-
Frog.

ings of the animals of Europe and of South America*. If it should appear that the male of the white tree-frog is possessed of vesicles on the throat, which become apparent only in the breeding season, this flute tree-frog may turn out only to be a variety of that species.

ART. XIX. *THE ORANGE TREE-FROG*†.

Orange
Tree-
Frog.

THE body of this species, which inhabits Surinam, is yellow, with a slight tinge of reddish, and its back is surrounded by a row of dots of a red colour. Seba says, that it only differs from the flute tree-frog in wanting the vesicles under the throat.

A tree-frog has been observed in Brasil of a golden yellow colour, diversified on the back with red, which is called by some naturalists

* From this sentence, there is reason to suppose the flute tree-frog an inhabitant of South America.—T.

† Syft. nat. ed. Gmel. i. 1055. G. 120. sp. 17. var. 7.—*Hyla aurantiaca*. Laurent. amph. 35. n. 31.—*Rana surinamensis*. Seba, Mus. i. t. 71. f. 3.

naturalists the skeleton tree-frog, on account of its excessive leanness*. Tree-frogs, however, like frogs, are subject to vary considerably in fatness even in a short time; so that there is reason to suspect this tree-frog may be sometimes found sufficiently plump to appear the same with the orange species, or at least a variety of that tree-frog occasioned by difference in climate or other circumstances.

Orange
Tree-
Frog.

ART. XX. THE RED TREE-FROG†.

THIS species has a large head and a wide mouth, and is of a red colour. It is found in America.

Red Tree-
Frog.

In Buffon's Natural History of Birds, under the article Crick, one of the parroquet tribe,

* Syft. nat. ed. Gmel. i. 1054. G. 120. sp. 16. var. —*Rana brasiliensis gracilis*. Seba, Mus. i. t. 73. f. 3.—*Hyla sceleton*. Laurent. amphib. 35. n. 33.—La Raine squelette. Encyclop. Method.

† La Rouge. Encyclop. Method.

Hyla rubra. Laurent. amphib. 35. n. 32. Seba, Mus. ii. t. 68. f. 5. Syft. nat. ed. Gmel. i. 1054. G. 120. sp. 16. var. 2.

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Red Tree-
Frog.

tribe, mention is made of a small tailless oviparous quadruped of South America, which is used by the Indians for giving a fine red or yellow colour to the feathers of parroquets. For this purpose, they pluck off the feathers of nestling cricks, and rub the skin with the blood of this oviparous quadruped: The feathers, which grow after that operation, instead of being green, which is the natural colour of the crick, become red or yellow. This operation is called *taping*.

The oviparous quadruped with which this operation is performed lives commonly in the woods. Several specimens, preserved in spirits, are contained in the Royal Cabinet, which are evidently tree-frogs, from having little buttons or pellets at the extremity of their toes. The colour of this tree-frog seems red or reddish, having two irregular longitudinal stripes of yellowish white or golden yellow on the back. It would appear that this beautiful little tree-frog ought to be considered as a variety either of the red or the orange species.

Like

Like the red tree-frog, the head is large in proportion to the size of the body, and the mouth is very wide*. All the animals of this order, frogs, tree-frogs, and toads, are subject to great variety, from different circumstances of age, sex, season, climate, and food, so that it is often extremely difficult to ascertain the proper place of particular individuals.

Red Tree-
Frog.

We may observe here, that the beautiful colours which nature has lavished with such magnificent bounty on the birds, insects, and butterflies, of South America, and which she has even bestowed on the frogs of that continent, are here again found on a species of this division of the class, the tapiring tree-frog having not only brilliant colouring on its own skin, but being even employed for augmenting artificially the natural beauty of other animals.

III.

* From the particular operation said to be performed by the Indians on parroquets with the blood of this frog, called *tapiring*, this species or variety is called *Rainca tapirer*, or tapiring tree-frog in the original.—

III. DIVISION.

OF TAILLESS OVIPAROUS
QUADRUPEDS,*Having compact rounded Bodies,*

T O A D S.

ART. XXI. THE COMMON TOAD*.

Common
Toad.

THIS animal has always been an object of disgust. The horror which its presence produces, is even felt by most people on

* Le Crapaud commun. Encyclop. Method.

Rana Bufo: Having a clumsy warty body of a lurid dusky colour variegated with brown. Syst. Nat. ed. Gmel. i. 1047. G. 120. sp. 3. Faun. suec. i. 253. It. oel. 142.—Bufo, f. Rubeta. Raj. quad. 252.—Rubeta, f. Phrynum.

on merely recollecting its hideous appearance; and those of weak nerves or delicate constitutions experience, by the very remembrance of its deformity, that coldness and shivering which almost infallibly accompany its touch. Every thing is disagreeable about the toad; even its name being employed to denote any thing hideous and vile. We are therefore astonished to find its race very widely extended almost in every country of the world, and connected

Common
Toad.

Phrynum. Gesn. pisc. 807. Bradl. nat. t. 21. f. 2.—*Φρύνος*. Arist. Hist. an. lib. ix. ch. 1. § 40.—*Bufo*. Virgil. Georg. i. 184.—*Rubeta*. Plin. Hist. nat. lib. viii. ch. 31.—*Bufo rubetorum*. Klein. quad. 122.—*Bufo terrestris*. Roefel, Hist. ranar. 85. t. 20.—Toad. Brit. Zool. iii. 13. n. 4.—*Pada*, Tassā. Faun. suec.

Var. β . *Bufo calamita*: With an olive coloured back; having an unequal stripe on each side of a bright yellowish red colour. Laur. amph. 27. n. 9.—*Röhrling*, *Kreuzkröte*. Roefel. Hist. ranar. 107. t. 24.

Var. γ . *Bufo viridis*: Having confluent green spots, with red intervals. Laur. amph. 27. n. 8. t. 1. f. 1.

Var. δ . *Bufo obstetricans*: Of a smaller size? Laur. amphib. 28. n. 12.—*Bufo terrestris minor*. Mem. de l'Ac. des Sciences, for the year 1741.

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Common
Toad.

connected with a number of resembling species so as to form a numerous natural family, or genus, in the class of tailless oviparous quadrupeds.

We are almost tempted to believe this ugly monster to be an accidental or spontaneous production of moisture and putrefaction, or one of Nature's whimsical creations in a sportive mood: And we are apt to doubt, how that genial mother of all created beings, who so generally unites elegant forms to beautiful colours, and who has bestowed some degree of gracefulness and ornament on frogs and tree-frogs, should stamp so hideous and disgusting a form on the toad. We are scarcely capable of conceiving, that it is only in consequence of arbitrary notions unfounded on truth and reason, that this animal has so universally been considered as one of the most disfavoured of beings, and almost an outcast among the children of Nature. It seems vitiously constructed in all its parts: The legs are so short as to be unable to raise its loathsome and cumbrous body above the filth which

Common
Toad.

which it inhabits ; and its eyes seem only formed to avoid the light. It feeds only on stinking and poisonous vegetables ; lives continually in mud, or squatted under stones, or in holes of rocks ; is filthy in its habitation, disgusting in its manners, ugly in its form, lurid in colour, and has a stinking breath. Scarcely able to crawl, it opens wide its hideous mouth when attacked, having no other means of defence except a fetid liquor, which it spurts out against its enemies ; and is only able to meet violence by obstinate resistance against blows. Its only good property seems that of avoiding the light, and withdrawing its detested figure from our loathing observation.

This vile animal occupies, however, a considerable place in the general plan of Nature ; being more profusely extended than many other favoured objects of her creative care. It would seem as if, in physics as in morals, the worst were of the most easy production : Or we might perhaps conceive, that Nature were disposed

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Common
Toad.

to augment the beauty of her other productions by means of this as a foil or strong contrast. We must, therefore, bestow some pains on these animals, which force us to yield them an unwilling attention ; and in so doing, that we may describe the toad such as it is, we must be contented to neglect delicacy of expression, which cannot accord with such a subject.

The clumsy squat and rounded figure of its body, has more the appearance of an unformed collection of matter, than of an organised body, arranged according to order, and created upon a concerted model. The usual colour is a livid grey, spotted with brown and yellowish ; sometimes, at the beginning of spring, it is a dirty red, growing afterwards first almost black, then olive yellow, and lastly reddish. The whole body is rendered extremely ugly by a number of warty tubercles, or rather diseased looking pustules, of a blackish green colour, sometimes pale red. A lengthened kidney-shaped protuberance, of a soft substance, with many visible pores, is situated
over

over each ear; and the auditory canal is shut by a membranous valve or covering. The skin of its flattened back is very thick, hard, and strong. The belly is large, and seems swoln. The fore legs are short, having four divided toes on each; while the hind feet have each six toes, which are united by membranes; the inner toe of each hind foot is large, yet so very short as to be scarcely visible in the skeleton. Instead of using these large hind feet for nimble leaping, like frogs and tree-frogs, the squalid toad only employs them to press the moist ground or filth on which it squats.

Common
Toad.

The head is rather larger than the whole body; having a very wide mouth, with rugged jaws, but without teeth. The eyelids are thick and swelled, and the eyes are large and protuberant, being often apparently animated with rage. It is wonderful that this animal, which seems kneaded out of cold and filthy slime, should be capable of any passionate sensations; as if Nature had permitted the mixture of extremes, on purpose to unite in one species

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Common
Toad.

every thing that could disgust our imaginations. The toad becomes irritated even by the slightest touch; swelling itself out with rage, and endeavouring to exert all its feeble strength. It resists long against considerable weight, when we attempt to crush it; and its vessels and organs must necessarily have very little connection or dependence on each other, as frogs have been known to live several days after being transfixed by a stake.

In almost every circumstance of form, and manners, and appearance, the toad is disgusting and disagreeable. Its leap is extremely limited and trifling, in comparison with that of the frog, and its gait is constrained, slow, and crawling. When in danger of being caught, it squirts out against its enemy some of the fetid liquor with which it is ordinarily besmeared; which has been considered by some writers as its urine, and which is capable of producing unpleasant or even noxious effects in certain circumstances. The whole surface of its skin exudes a milky fluid, and

a frothy liquor continually distills from its mouth; both of which are in some degree poisonous, and may infect such herbs or fruits as they happen to touch, so as to produce unpleasant effects on those who eat them without having them previously washed. The venomous or corrosive quality of these fluids is in all probability less or more active, in proportion to the temperature of the climate or season, according to the kind of food which the toad meets with, or to the nature of the animal or the part on which it acts. Hence the tract of a toad may be in certain circumstances as dangerous as its appearance is disgusting; and it may naturally be asked, how an animal, which thus infects both the land and the water, is permitted to exist; but the attempt to extirpate a species which is so widely extended and so prolific is perhaps impossible.

The ordinary habitation of the toad is in ditches, especially such as contain putrid stagnant waters. It is likewise found in dunghills, damp cellars, deep caves, and in

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Common
Toad.

the close covert, of forests, where it may readily withdraw, under the ruins of trees or buildings, or under stones and rocks; from the light of the sun, which seems quite uncongenial to its nature and dispositions. In these obscure retreats it usually keeps concealed all day, and only ventures abroad in search of food in the night or during rain. We are often seized by a kind of horror, when, on removing a stone in some damp wood or forest, a toad is discovered squatting on the earth, his eyes enflamed, and his ugly pustular deformed body swollen out with rage or terror.

In some countries, as at Carthage and Porto-bello in America, toads are so extremely numerous, that in rainy weather not only the marshy grounds, but the gardens, courts, and streets, are almost entirely covered with them; insomuch that the inhabitants have conceived, that each drop of rain becomes changed into a toad. In these countries, the toad is of considerable size, the smallest individuals being six inches in length. If it happen to rain during the
night,

OVIPAROUS QUADRUPEDS. 281

night, the whole toads quit their hiding places, and crawl about in such inconceivable numbers, as almost literally to touch each other, and to hide the surface of the earth, so that it is impossible to stir out of doors without trampling them under foot at every step. It is pretended by some writers *, that, besides their enormous size, the toads of the hotter parts of South America are extremely venomous, and give dangerous bites. The excessive heat of these countries, and the particular nature of their food, may probably increase the deleterious nature of their fluids, but the toad has no teeth, and cannot therefore be supposed to bite.

Common
Toad.

During winter, in Europe, the toads gather into little companies in the same hole, apparently on purpose to augment and prolong the small remains of heat, and to postpone as long as possible the period of their torpor. In such situations, they are most readily discovered for the purpose of destroying them, as they are then incapable of

* Ulloas Voyage to South America.

Common
Toad.

of escaping. After recovering from their state of hybernation, they go about mostly in the night in search of food. Like frogs, they live on insects, worms, beetles, and snails; but they are said likewise to feed on sage, and to seem fond of remaining under the shade of that plant; and hemlock has been sometimes called toads parsley, on account of its being greedily eaten by them*.

Towards sun set in the beginning of the fine weather of spring, the toad may be heard emitting a tolerably soft cry, which is probably the call of love. Is it then possible, that so loathsome and detestable an animal should experience the influence of that passion, and should even be actuated by it earlier in spring than the other oviparous quadrupeds without tails? But the duty of a naturalist exacts from us a rigid adherence to truth, and even requires that nothing should be neglected in the history of this animal, which can contribute to diminish the abhorrence which its appearance produces: We shall therefore

* Geoffroy, Mater. Medic. xii. 148. give

give a faithful account of its mode of union, omitting no circumstance of the extraordinary attentions of the male, which seem to indicate a more than ordinary affection on his part for the female.

Common
Toad.

The sexual intercourse takes place in March or April, and is mostly carried on in the water, as is the case with frogs and tree-frogs. But the male often gets hold of the female at a considerable distance from brooks or marshes; and, placing himself on her back, embraces her with such force, that she is obliged to carry him to the water; and, though oppressed with her burden, she seldom or never allows any of her eggs to escape during her painful journey. The union lasts generally for six or seven days, and as far as twenty or even more in cold seasons*. During the whole time both male and female croak continually; and the male often emits a tolerably loud grunt, when any one endeavours to separate him, or when he observes the approach of another male; in which latter case, he seems

* Spallanzanis Essays, iii. 31.

Common
Toad.

seems to be extremely angry at the intruder, and endeavours to push him away by means of his hind feet. Though severely wounded, he will on no account quit his female; and, if separated by force, returns to her the moment he is left at liberty, and resumes his intimate union, even though covered over with wounds, and deprived of some of his limbs. Towards the end of this union, the female begins to protrude her eggs; and is assisted by the male, who draws them out with his hind legs, causing them to pass close to his own anus, from which they almost seem to come out, and impregnates them by the way. After continuing this exercise for some time, the male and female rise to the surface of the water to breath, and in about a quarter of an hour sink again to the bottom to resume their labour. These intervals of rest are frequently repeated, nine or ten times during twelve or fourteen hours, the usual period which is occupied in protruding the whole burden of eggs. These are surrounded and attached together by a transparent

parent glairy fluid, so as to form two strings or rows, that continue adhering to each other and to the anus of the female until the whole is protruded; and the double row of eggs sometimes extends to the length of forty feet. These eggs are often found dry at the bottom of ponds or ditches from which the water has been evaporated.

Light is offensive to toads during the sexual intercourse, as in all other periods of their life. Hence that union takes place very early in the morning, and even frequently during the night. The eagerness of the male seems sometimes to subsist after the whole eggs of the female have been protruded and impregnated: As Mr Roessel * has seen them continue their embraces for above a day after that process was accomplished; which circumstance was ascertained by dissecting the female, and finding her ovaries entirely empty. Thus, even in this vile reptile, we find an instance of the almost universal despotism of male animals over the weaker sex, by constraining the

Common
Toad.

the female) to submit to his gratification, though no reciprocal desire remains on her part. This tyrannical abuse of superior strength seems farther confirmed by what has been formerly mentioned, of the male often obliging the female to carry him from a considerable distance to the water, the only convenient place for the purposes of their union, and where only, in all probability, their desires can be mutual. On the other hand, however, it appears that the male toad takes more pains than the frog, both for properly impregnating the eggs of his female, and for assisting her in getting them protruded from the body.

In the Memoirs of the Academy of Sciences for 1741, M. Demours gives an account of his observations on a male and female toad, which he found coupled together on the ground, in the Royal Garden. Though surprised, and apparently much disturbed, the male continued his operations, assisting the protrusion of the eggs with his hind feet, the female not being able to accomplish that affair so readily as
in

in the water. Laurenti has considered this toad, observed by M. Demours, as a distinct species, to which he gives the name of *Bufo obstetricans* *: But there seems no proper reason for separating it from the common toad. Such eggs as are dropped on the ground never hatch, unless they happen to be deposited in some covered and moist place, capable of preventing them from drying, and of supplying nourishment to the tadpoles. According to Spallanzani, the eggs or spawn of toads are capable of being hatched when the thermometer of Reaumeur stands only six degrees above Zero, or at the temperature of $45\frac{1}{2}$ of Fahrenheit's scale.

Common
Toad, *BUT*

The strings which connect the eggs increase in size along with them, and the eggs grow in ten or twelve days to about double their original diameter. The included globules, at first black on one side and whitish on the other, become gradually covered by ramified lines, insensibly acquiring

* Laurent. amphib. 28. n. 12. 128. Syft. Nat. ed. Gmel. i. 1047. G. 120. sp. 3. d.

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Common
Toad.

quiring the form of the tadpole, which may be distinctly perceived about the seventeenth or eighteenth day. Two or three days afterwards, the tadpole disengages itself from the glairy matter which surrounds the egg : It immediately endeavours to rise to the surface, but is soon obliged to sink again to the bottom of the water. In the course of a few days after leaving the egg, it acquires a peculiar organ on each side of the neck, similar in some respects to the gills of fishes : This organ is divided into five or six fringed appendages, and disappears entirely about the twenty-third or twenty-fourth day after the exclusion of the tadpole from the egg. At first, the young tadpole seems only to feed on mud and other foulnesses in the water ; but, as it increases in size, it feeds on aquatic vegetables. Its growth and metamorphoses proceed exactly like those of frog tadpoles, already described ; and, when completely developed, like them, it quits the water, to live in damp places on the ground.

Like

Like other animals of this class, toads are larger and more venomous in proportion to the increased temperature of the countries in which they are found, and according to other circumstances in the climate or soil that are adapted to their nature and habits. Among the specimens in the Royal Cabinet, there is one which measures four inches and a half in length, from the muzzle to the vent. On the gold coast of Guinea, some are found of such vast size as to be occasionally mistaken for land tortoises. These are inveterate enemies to the serpents, according to Bosman, who has frequently witnessed severe combats between these two animals. The contrast between the shapeless and cumbrous mass of the toad, swelling out with rage, with the agile windings of the serpent, must be extremely curious and interesting to the beholder: Both of them irritated to fury, expressed in very opposite manners; the one resisting by its strength, and the lumpish weight of its carcase, while the other makes every effort to suffocate its antagonist among the

Common
Toad.

folds of its twisted body; the eyes of both as if on fire with rage, and each endeavouring, by means of its specific venom, to gain the victory, which force alone is unable to acquire, by the instillation of poison into wounds produced by the hollow fangs of the serpent, and by the fetid and venomous saliva and corrosive exudation from the surface of the toad.

The toad is not capable of reproduction until four years of age. Some have alleged that its age never exceeds fourteen or fifteen years; but this opinion seems not well founded. It would require a vast number of careful observations, following many individuals through all their haunts, to ascertain with any precision the ordinary duration of their life, independent of accident or want of food. There is, on the contrary, a well attested instance, in the British Zoology, of a toad having lived thirty-six years. This instance is peculiarly interesting, on account of the singular manner in which this lengthened life was spent; as it shews how much domestication

tion is capable of influencing the natures of all animals, particularly those that are most susceptible of injury; and that organizations of moderate intricacy may be easily forced to assume new directions, without being destroyed, or even deranged in their operations. This singular toad lived for the most part in a dwelling-house, in which it may be said to have been bred and educated. It did not certainly acquire that kind of affection for its benefactors which is observed in some species of domesticated animals, and for which its native manners and instincts are by no means fitted; but it became tame, and even familiar. The light of a candle, ordinarily offensive to the species, was to it the signal of being fed; and, instead of avoiding, it anxiously waited and even followed the welcome light. This toad had originally taken up its residence under an outer stair before the door of the house, and was of considerable size when first taken notice of. It came forth from its hole every evening, immediately on observing the candle, wait-

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Common
Toad.

ing deliberately to be lifted up and carried to a table within the house, where it was fed with various insects, flies, and millepedes, but particularly preferred maggots or small worms, apparently on account of their brisk and lively motions. It watched these with great eagerness, and, having measured the distance with its eyes, darted out its long tongue, to which the worm or insect adhered, by means of the viscid liquor with which it is smeared over. Having never been injured by any person, it shewed no signs of uneasiness or anger when touched; and though a toad is so universally loathed, this became the object of general curiosity, and even the ladies were curious to see the tame toad. In this uncommon state of domestication it lived thirty-six years in good health, and might in all probability have continued to live much longer, but was one day attacked at the mouth of its hole by a tame raven, which put out one of its eyes, notwithstanding every effort was used to save it. After this, it could no longer seize its prey with the same readiness, not being
able

able to judge its distance and situation with the same accuracy, and gradually pining away, died in about a year after the accident.

Common
Toad.

The facts related of this toad, in its domestic state, seem to contradict the general opinion relative to the filthy propensities and noxious properties of the species, or at least to prove that these have been much exaggerated. It may be said, however, on the other hand, that this toad inhabited England, where its evil habits were modified by the coldness of the climate; and that the individual, having enjoyed thirty-six years of domestication, of safety, and of abundant food, might thereby have had its nature and propensities very much changed, as the habits of all oviparous quadrupeds seem greatly more susceptible of modification than those of more perfectly organized animals. We may perhaps conclude, that, when supplied with abundance of food of a particular kind, and when preserved from the ordinary dangers incident to its natural life, the toad may be improv-

Common
Toad.

ed, like many other species of animal : But perhaps we must still admit those vicious habits and noxious qualities in toads, in a state of nature, which have been so long and so generally attributed to them.

As human ingenuity is capable of turning almost every thing to use, changing even mortal poisons into salutary remedies, so even toads have been used in medicine, in various manners, and as antidotes to various distempers. M. Adanson* relates, that his negroes rubbed their foreheads with living toads, which they found among the bushes, to relieve themselves from the headach, produced by the heat of the sun reflected from the sand; adding, that it is a common custom, and is attended with salutary effects.

There are numerous observations which seem to indicate at first sight that toads may acquire their full growth, and live for a vast number of years, in the hollow of a tree or of a stone, entirely shut out from communication with the external air : But
this

* Natural History of Senegal.

this notion has been entertained in consequence of the trees or stones not having been carefully examined before finding the toads in their cavities *. The general opinion on this subject cannot be admitted; but it is, however, certain that a toad may live a long time, even eighteen months, without any food, and in some measure without respiration. The experiments of M. Hérissant place this beyond doubt; as he has repeatedly kept them for that length of time in wooden boxes carefully sealed †. This fact is an additional proof of what has been already advanced in this work, in the preliminary discourse concerning the nature of oviparous quadrupeds.

Common
Toad,

We now proceed to review the characters by which the other species of toads, both of Europe and other parts of the world, may be distinguished from the common toad now described. There is hardly any climate in which Nature has not been

T 4

prodigal

* See Encyclop. Method. article Crapaud.

† Eloge de M. Hérissant, in Hist. de l'Acad. des Sciences, 1773.

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Common
Toad.

prodigal of these hideous animals: And the species seem only to be diversified by means of additional deformities, as if desirous of accumulating ugliness on this outcast genus.

ART. XXII. *THE GREEN TOAD* *.

Green
Toad.

THIS species is found in the environs of Vienna, in the clefts of rocks, and holes of old walls. It is of a livid white colour, the upper part of its body being clouded with green confluent spots, surrounded by a black line, and slightly dotted. The whole body, except the throat and

* Le Vert. Encyclop. Method.

Bufo viridis: Having confluent green spots and green warts, with red warts in the intervals of the spots. Laurent. amphib. 27. n. 8. t. 1. f. 1. Syst. Nat. ed. Gmel. i. 1047. G. 120. sp. 3. 7.

Rana sitibunda: Having half-webbed hind feet, with the rudiments of seven toes on each; of a bluish-grey above, with blackish green spots, and dirty white underneath. Pall. it. i. 458. n. 16. Syst. Nat. ed. Gmel. i. 1050. G. 120. sp. 23.

and the extremities of the feet, are interspersed with warty protuberances; which are livid on the belly, green upon the spots, and red on the spaces between the spots.

There is reason to conclude that the corrosive exudation from this species is more noxious than that of the common toad. When enraged, its eyes appear on fire, its respiration is accompanied by a swelling of the throat, and its body becomes smeared over with a viscid humour, having a fetid odour like that of black nightshade, but considerably stronger. Its fore-feet are always turned inwards.

As this toad inhabits the same countries with the common species, it is difficult to decide, whether its differences in colour and in the disposition of its warts should establish it as a distinct species, or only as a variety more or less constant.

The green toad described by Pallas is found in considerable numbers about the Caspian, and in the dry deserts near the river Ural, lying in holes in the day, and leaping about in the evening. It is of the
same

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Green
Toad.

same general figure with the common toad, but larger. The head is short and wrinkly, being as if puckered with a thread about the eyes; the eyelids are somewhat fleshy; the body is sprinkled over with slightly prominent brown dots, and great numbers of small warts, which are largest on the sides, and most numerous about the flanks and loins. The great toe on each fore foot is split or divided, and on each hind foot there is a prominent callus, like the rudiment of a toe, on each side.

ART. XXIII. *THE VARYING TOAD* *.

Varying
Toad.

IT is very possible that the subject of the present article may only be a variety of the green toad. Its general colour is like

* Le Rayon-vert. Encyclop. Method.

Rana variabilis: With protuberant back and sides; the warts being brownish yellow in the center, those on the back being very small, and larger on the loins; the colour variable. Pall. Spicil. Zool. vii. t. 6. f. 3. 4. Syst. Nat. ed. Gmel. 1. 1051. G. 120. sp. 26.

Bufo Shreberianus. Laurent. amphib. 27. n. 7. Roefel, Hist. Ranar. 108.

like that of raw flesh, with divaricating lines of green, which may be considered as forming the distinguishing character. In size it resembles the esculent frog, being of a middle appearance, between the toad and frog kinds. The head is rounded; the mouth has no teeth, but the upper jaw has a double edge; the tongue is thick and fleshy, its tip being simple, and its base slightly two-lobed; the lower eyelids are plaited, and the upper are hardly sensible; the tympanum, or drum of the ear, is discoverable, and of a whitish colour; the upper part of the body is warty, particularly on the flanks where they have a mammillary form; the throat is covered with very small rough protuberances. The fore feet have each three toes edged with membranes underneath, and a thumb or great toe larger than the others; the hind feet have each five webbed toes, the second toe being longer than the rest.

Varying
Toad.

According to Mr Edler of Lubec, and other succeeding observers, this species frequently changes colour, like the chameleon
and

Varying
Toad.

and some other lizards, from whence the trivial name given by Pallas, and adopted from the *Systema Naturae* into this edition : This circumstance introduces a new link of connection between the several genera of oviparous quadrupeds. While it is in motion, it is of a white colour, interspersed with spots of fine green, and the warts appear tawny yellow : When at rest, the green colour of its spots changes to an ash colour of various shades : When touched, or disturbed, the general white ground becomes similarly ash-coloured : When exposed to the rays of the sun, which it naturally avoids, all the beauty of its variegation vanishes, and it becomes of an uniform ash colour : When preserved in spirits, the specimen becomes yellowish-ash, with an olive tint on the upper parts. One individual, found in a torpid state by M. Schreber, was of a flesh colour between the green spots.

It still, however, requires to be determined, by the more accurate observations of future Naturalists, whether the above description

scription of the toad discovered by M. Schreber in Saxony, and that described by Pallas are the same, or varieties of the same species.

Varying
Toad.

ART. XXIV. *THE BROWN TOAD* *.

THIS toad is smooth skinned with hardly any warts, being marked with large contiguous brown spots : The largest and deepest coloured of these are on the back ; along the middle of which is a streak of lighter colour than the rest. The eyes are singularly constructed, having their narrow pupils placed vertically, instead of transversely. Each hind foot has a hard horny protuberance, or false claw, on its sole. The female is distinguishable from the male, by having spots on the belly.

Brown
Toad.

This

* Le Brun. Encyclop. Method.

Bufo fuscus : Having a smoothish white skin with many brown spots. Laurent. amphib. 28. n. 10. Roefel. Hist. Ranar. t. 17. 18. Syst. Nat. ed. Gmel. i. 1048. G. 120. sp. 6. 7.

Brown
Toad.

This toad is more frequently found in marshes than in waters. When enraged, it exhales a fetid odour, like that of garlic, or burning gun-powder, which is so strong as to make the eyes water. Roesel suspects it of being venomous; and both Actius and Gesner assert that it is capable of producing death, either by its poisonous breath, or when a person eats marsh vegetables on which it has shed its lethal liquor. The opinion of these two latter authors is probably exaggerated; but still, toads in general, and the present species in particular, have sufficiently noxious properties to justify the aversion which they almost universally inspire. The brown toad is found in Scania, Germany, and Switzerland: It leaps somewhat like a frog, and emits a clear laughing like sound.

M. Pallas describes a toad *, as common about the Caspian, the Volga, and the Ural,

* *Rana ridibunda*: Being ash coloured above spotted with brown, having a yellow or greenish line along the back; the under parts being smooth and whitish. Pall. it. 1. 458. n. 14. Syst. Nat. ed. Gmel. i. 1051. G. 120. sp. 25.

al, under the name of laughing toad, which seems the same with this or nearly allied to it. It is of the form of the common frog, but shorter and broader, being usually near half a pound weight. It keeps constantly in the water or in marshes, never coming on dry land; and, in the evenings, its croaking, which is heard to a great distance, has a good deal of resemblance to a loud laugh. The head is broad and flat at the sides; the upper eyelids are prominent and interspersed with pores; the drum of the ear is smooth and flat; the back is covered with pores; the base of the great toe on each fore foot is thick and divaricated; the next toe being shorter than any of the others; on the inside of each hind foot there is a callous protuberance, resembling the rudiment of a sixth toe, and all the toes on the hind feet have warty protuberances on the under sides of their joints.

ART.

ART. XXV. *THE CALAMITE* *.

Calamite

THIS toad inhabits Europe, particularly in Germany, and has considerable resemblance to the brown species, though the differences between them are sufficient for constituting two distinct species. The body is somewhat narrow, and is much diversified in colours; the back is olive, having three longitudinal stripes, of which that in the middle is sulphur yellow, the one at each side being waved and indented, and of a bright red mixed with yellow, which becomes deeper towards the lower edge; the throat, the sides of the belly, and the four legs, are marked with several unequal olive spots; over the whole surface there are

* *Le Calamite.* Encyclop. Method.

Bufo Calamita: Olive on the back; having an irregular bright yellowish red stripe on each side. *Laurent. amphib.* 27. n. 9. *Syst. Nat. ed. Gmel. i.* 1047. *G.* 120. *fp.* 3. *β.*

Roehrling, Kreutz Kroete. *Roef. Hist. Ranar.* 107. t. 24.

are a number of pimples or warty protuberances, those on the back being brown, those towards the sides red, pale red near the ears, and of a bright red in clusters about the angles of the mouth; the tips of the toes are blackish, and covered with a hard horny skin instead of claws; on the soles of the fore feet there are two bones or false claws, by which the animal can adhere to any thing; the toes of the hind feet are separate.

Calamite.

The calamite remains all day in holes of the earth, or chinks of old walls. Instead of moving only by leaps, like most of the tailless oviparous quadrupeds, it climbs, though with difficulty, and with frequent stops, and sometimes climbs several feet high on the walls, on purpose to get at its hiding place. The calamite is seldom found solitary, being frequently collected in companies of ten or twelve together in its retreats. During the night it goes abroad in quest of food; and, on purpose to avoid being followed by enemies, it exudes a fetid liquor from its skin, smelling

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Calamite. like burnt gun-powder, but considerably more offensive.

In the month of June, such individuals as are three years old and nearly of their full size, gather together among the reeds on the borders of marshes, on purpose to copulate; and at this time their croaking is very loud and singular. It might be supposed, that the particular habits of this toad should modify the nature of its juices, so as to prevent them from being venomous; yet Roefel asserts the contrary, grounding his opinion upon their being avoided by storks, which are very fond of preying on frogs.

ART. XXVI. *THE FIERY TOAD* *.

*Fier
Toad.*

THIS is one of the smallest species of toads, and was discovered by Laurenti on the banks of the Danube, though described

* *Le Couleur-de-feu.* *Encyclop. Method.*

Bufo igneus. *Laurent. amphib. 29. n. 13.* *Albert. Magn. 251.*

Rana Bombina: Having an orange belly, spotted with

described less accurately by former naturalists. The back is very deep olive, spotted with dirty black; the belly, throat, legs, and soles of the feet, are bluish white, spotted with bright vermilion, or orange, from which the trivial name is derived. The whole surface of the body is scattered over with small warts. When exposed to the light of the sun, the pupil assumes an exact triangular form, and is edged with golden yellow. This species is very numerous in the marshes near the Danube; and a variety is sometimes found of which the belly is black spotted and dotted with white. It is often found on dry land in autumn; and when any one comes near, if water be at hand, it leaps in with great agility, like a frog; but if no means of escape presents, it squats close to the ground, as if for concealment: If touched, it bends its head

U 2 backwards;

with bluish; the pupils being triangular. *Syst. Nat.* 6d. *Gmel.* i. 1048. *G.* 120. *sp.* 6.—*Ed.* xii. 355. *n.* 6. *Faun. suec.* *n.* 277.

Rana variegata. *Syst. Nat.* *Ed.* x. 211. .
Feuer Kroete. *Roefel. Hist. Ranar.* t. 22. 23.

Fiery
Toad.

backwards; and if teased it exhales a fetid odour, and emits a frothy liquid from the anus. It croaks without swelling the throat, and its voice resembles a hollow interrupted growl; which is sometimes prolonged, so as to resemble, according to Laurenti, a kind of laughing noise.

The excluded eggs of this species are collected into little bundles or clusters, like those of the frog, instead of being disposed in rows like those of the common toad. Instead, likewise, of avoiding light, like other toads, it seems to delight to bask in the sun's rays on the banks of marshes; so that, in several respects, it forms a connecting link between frogs and toads. From the experiments of Laurenti, it would appear that the exudation of this animal has no noxious property, except to render drowsy small grey lizards, which we have already had occasion to remark, are very readily affected by the weakest venom.

ART.

ART. XXVII. *THE PIMPLY TOAD* *.

THIS species, which is remarkable by being covered with a kind of pimples, and by its toes being beset with thorn-like tubercles, is found in India. It is of a dark greenish red, brighter on the sides and belly, which last is spotted with dull red. Each fore foot has four separate toes, and each hind foot five toes connected by webs.

Pimply
Toad.

ART. XXVIII. *THE GOITROUS TOAD* †.

THIS toad, which inhabits India, is of a round form and dull red colour, its back having three longitudinal ridges; the belly

Goitrous
Toad.

U 3

belly

* Le Pustuleux. Encyclop. Method.

Bufo pustulosus: Having whitish milky pustules. Laurent. amphib. 26. n. 4. Seba, Mus. i. t. 74. f. 1. Syst. Nat. ed. Gmel. i. 1049. G. 120. sp. 7. β.

† Le Goitreux. Encyclop. Method.

Rana

Goitrous
Toad.

belly is much swollen ; but its distinguishing character, from which the trivial name is derived, consists in a remarkable protuberance or swelling of the throat. The two outer toes on each fore foot are united together.

ART. XXIX. *THE HUNCHED TOAD* *.

Hunched
Toad.

THE head of this species is blunt, small in proportion to the body, and seems sunk into the breast, owing to the extreme shortness and thickness of the neck. The body is wrinkled, and very much convex or hunched on the back, but without warts.

Its

Rana ventricosa : Having a semioval mouth ; the throat being prominent. Syft. Nat. ed. Gmel. i. 1049. G. 120. fp. 7. Mus. ad. frid. i. 48.—*Bufo ventricosus*. Laurent. amphib. 26. n. 5.

* Le Boffu. Encyclop. Method.

Rana gibbosa : Having a convex egg-shaped body, with a longitudinal indented ash-coloured line on the back. Syft. Nat. ed. Gmel. i. 1047. G. 120. fp. 5. Amoen. acad. i. 286. Mus. ad. frid. i. 48. Laurent. amphib. 27. n. 6.

Its colour is mottled or clouded, having an ash coloured indented stripe along the middle of the back. Each fore foot has four toes, and each hind foot six. It is found in India, and likewise in Africa, the individual from which our drawing and description was taken, having been brought from Senegal to the royal cabinet.

Hunched
Toad.

ART. XXX. *THE PIPA* *.

THIS is one of the most extraordinary toads of South America. The male and female are so different from each other, both in size and appearance, as to be often

Pipa.

U 4 taken

* Le Pipa, or Cururu. Encyclop. Method.

Rana Pipa: Having the fore toes divided at their tips into four lobes without claws; the hind toes having claws. Syst. Nat. ed. Gmel. i. 1046. G. 120. sp. 1. Mus. ad. Frid. i. 49. Gronov. Mus. ii. 84. n. 64.

Bufo, f. Pipa Americana. Seba, Mus. i. 121. t. 77. f. 1. 2. 3. 4.—Bufo major furinamensis. Wagn. Mus. 15. t. 7.—Bufo aquatius furinamensis. Vincent. Pip. 1726. t. 62.—Rana furinamensis. Bradl. Nat. t. 22. f. 1. Vallisn. Nat. i. t. 41. f. 6. Camper, Schrift. der Berl. Nat. vii. 200. Fermin, Monagr. Pl. Enlum. n. 21.

Pipa.

taken for distinct species; for which reason, instead of a general description of the species, we shall describe each sex separately.

The *male* has four separate toes on each fore foot, and five webbed toes on each hind foot; all of the toes on the fore feet are divided at their extremities into four small parts or lobes, without claws: The head and body are scarcely distinguishable from each other; the mouth is extremely wide; the eyes are very small, distant from each other, and placed on the top of the head: The head and body are much flattened, the general colour being somewhat olive, of different shades, interspersed with very small reddish spots.

The *female* is much larger than the male: The head and body are similarly flattened; but the head is triangular, being larger at the base than the fore part of the body; the eyes are very small and distant from each other, as in the male: The structure of the feet are similar to those of the male, the subdivision of the fore toes into four lobes

lobes being more distinct : The body is for the most part covered all over with very small warts. The female specimen in the royal cabinet measures five inches and one third from the muzzle to the anus. Pipa.

The most extraordinary circumstance in the history of this animal, and perhaps one of the most singular and interesting facts in natural history, is the manner in which the embryo is developed *. Madam Merian †, to whom we owe the first observations on this wonderful subject, has mistakenly supposed that the young were conceived beneath the skin on the back of the mother. The fact is, that, after the eggs are excluded from the female and fecundated by the male, in the same manner with those of all other toads, instead of dispersing them in the water, the male collects them under his belly with his feet, and spreads them over the back of the female, where

* See a Memoir on this subject, in the Journal de Physique for 1779. V. ii. 425. by M. Bonnet.

† Dissert. de Generat. et Metamorph. Insect. Surinam.

Pipa.

where they stick close by means of the viscid liquor which surrounds them : By some unknown process, perhaps irritated by some property of the male seminal liquor, the skin or the back of the female tumifies, and forms little cells over all the eggs. In this singular situation, like a kind of external matrix, the eggs increase in size and the tadpoles are formed, perhaps more expeditiously than in the ordinary way by the assistance of the heat of the female ; and, when the young tadpoles are completely formed, they come out from the cells more advanced in their state of growth than ordinary tadpoles ; having already lost their tails, which they were furnished with in the early stage of their existence *. After they are all come forth, the female gets quit of the remainder of the cells, and of part of her skin, by rubbing herself against stones or vegetables, and the injured skin is renewed by a fresh growth.

Though we have given to this phenomenon the epithets of singular and extraordinary,

* Spallanzanis Dissertations.

dinary, it is only to be considered as such ^{Pipa.} in relation to our limited knowledge ; for nature never produces isolated beings or facts, having, generally at least, only expressed existing properties in greater or lesser degrees in different instances, running them often into each other by insensible shades, which connect the opposite extremes. In reality, the mode of development observed in the pipa, must not be considered as exclusively appropriated to this animal, at least generally ; for a mode somewhat similar has been observed in the opossum, in which the young, immediately after birth, are received into a pouch, or external matrix, under the belly of the mother.

It would appear that the flesh of this toad is not unwholesome, as, according to Mad. Merian, the negroes of Surinam eat of it with pleasure, and suffer no inconvenience from its use.

ART.

ART. XXXI. *HORNED TOAD* *.Horned
Toad.

THIS hideously ugly species is found in America. The head is almost as large as the body, having an enormous mouth, with a broad thick tongue : Its eye-lids are shaped like sharp conical horns, in the base of which the eyes are situated. When full grown, this horned appearance, joined to the back and thighs being all over rough with spines, gives the animal a very horrible aspect. The ground colour is yellowish, having longitudinal brown streaks on the back, and transverse streaks of the same colour on the legs and toes, with a broad whitish stripe from the head to the anus, having a small round black spot on each side near its origin. The fore feet have

* *Le Cornu.* Encyclop. Method.

Rana cornuta : Having conical projecting eye-lids. *Syst. Nat.* ed. Gmel. i. 1050. G. 120. sp. 11. *Mus. ad. frid.* i. 48.—*Bufo cornutus*, f. *spinofus virginianus*. *Seba, Mus.* i. t. 72. f. 1. 2. *Laurent. amphib.* 25. n. 2. *Naturalist's Miscellany.*

have each four separate toes, and each hind foot has five toes connected by webs : Seba asserts, that in the female all the toes are separate. In the female, the first toe on all the feet is placed at a distance from the others, giving an imperfect resemblance to the human hand, and increasing the disgusting and monstrous appearance of the animal ; for no circumstance whatever can add more to deformity, and to the disgust with which we are accustomed to contemplate it, than such resemblances to what we usually consider as the most perfect conformations.

Horned
Toad.

ART. XXXII. *THE AGUA* *.

THE large toad which forms the subject of this article, is named *Aguaquaquan* in Brasil, by an abridgement of

Agua.

* *L'Agua.* Encyclop. Method.

Rana brasiliensis : Of a yellowish ash colour, with waved red spots ; the under parts being smooth. *Syst. Nat. ed. Gmel. i. 1049. G. 120. sp. 19. Laurent. amphib. 26. n. 3. Seba, Mus. 1. t. 73. f. 1. 2.*

Agua.

of which the trivial name here employed is formed. The ground colour is yellowish ash, with waved red spots approaching to flame colour; the upper parts of the body being covered with small protuberances, and the under parts smooth. The fore feet have each four separate toes, and each hind foot has five toes connected by webs. A specimen of this species, in the royal cabinet, measures seven inches and one third from the muzzle to the anus.

ART. XXXIII. *THE MARBLED TOAD* *.

Marbled
Toad.

THIS species, which has some resemblance to the Agua, inhabits Surinam. It has four divided toes on each fore foot, and five webbed toes on each hind foot. In size it is greatly smaller than the

* Le Marbré. Encyclop. Method.

Bufo marmoratus: The back being variegated with red and yellowish ash, like marble; having a yellow belly with black spots. Laur. amphib. 29. n. 14. Seba, Mus. i. t. 71. f. 4. 5. Syst. Nat. ed. Gmel. i. 1048. G. 120. sp. 5. β .

the agua. The upper parts of the body are marbled or variegated with red and yellowish ash colour, the belly being yellow with black spots.

Marbled
Toad.

ART. XXXIV. *THE VOCIFEROUS TOAD* *.

THIS toad, which is found in Surinam, is one of the largest of the genus. The skin is variegated with livid blue and brown, and is covered all over, both above and underneath, with protuberant points or small warts. The shoulders, which are covered in a similar manner, are raised into large bosses, and are pierced by numerous pores. It is easily distinguishable from the Pipa, by having five toes, with hardly any apparent claws, on all the feet, the hind feet only being half-webbed.

Vocifer-
ous Toad.

The vociferous toad inhabits the fresh waters, making a continual harsh croaking :

From

* Le Criard. Encyclop. Method.

Rana musica : Having protuberant porous shoulders. Syst. Nat. ed. Gmel. i. 1046. G. 120. sp. 2.

Vociferous
Toad.

From this incessant noise, Linnaeus has given it the name of Musician or musical toad, but the term here adopted from M. Daubenton agrees better with its harsh discordant voice, which only serves to disturb the harmonious concerts of the feathered choristers in the peaceful groves of South America.

TWO

OF TWO-FOOTED REPTILES.

WE have formerly remarked that the
seps and chalcides resemble the or-
der of serpents, in the great length of their
bodies and the extreme shortness of their
scarcely observable legs: The animals of
the division now under review are still
more closely allied to serpents on the one
hand, and lizards on the other, forming the
first link of a connecting chain, of which
those two other animals form the second;
the former coming nearer the lizard, and the
present approaching more closely to the ser-
pent tribe. The animals of the present divi-
sion differ from lizards, in having only two
feet instead of four; while they are distin-
guished from serpents, by the possession of
these two feet, serpents invariably being
destitute of feet and legs. In other respects
they might very readily be mistaken for
serpents, which they resemble in length of
body,

Bipeds in
general.

Bipeds in
general.

body, shape of the head, and form of the scales.

The existence of bipeds, or two-footed reptiles, was long doubted by naturalists; and most of the specimens, which have been shown for such, were only of the seps or chalcides species, which had lost either their fore or hind legs by accident or design; in them all, the cicatrix was evident on inspection. Other specimens of pretended bipeds were male serpents, which had been killed in the pairing season, at a time when their double organ happened to be out from the anus, just before uniting with the female: The two parts of this organ stand at some distance, and are covered with certain roughnesses, which might be mistaken at first sight for scales. Serpents killed in this state have frequently been transmitted to the Royal Cabinet as two-footed serpents or bipeds; and we are disposed to consider the animal described by Linnaeus, under the name of *Anguis bipes*, and placed by Gmelin in the genus

Lacerta,

Lacerta, as one of these real serpents, surprised in the sexual union.

Bipeds in
general.

Several of the pretended bipeds, which occur in authors or collections, must be considered as larvae or tadpoles, in a greater or lesser degree of developement, or in a later or earlier stage of growth, of the frog, toad, tree-frog, or water-lizard tribes; as all of these oviparous quadrupeds have ordinarily only two feet in the earlier period of their existence. Such, for instance, is the animal for which Linnaeus considered it necessary to institute a new order, under the name of *Syren lacertina* *. That animal was sent, from Charlestown in South Carolina, by Dr Garden to Mr Ellis, who has engraved and described it in Vol. LVI. of the Philosophical Transactions. It is very common in Carolina, where it is called the Mud Guana, being found on the borders

X 2

of

* That animal is placed by Gmelin in the class of fishes and order Murena, under the name of *Murena Syren*: Having feet-like pectoral fins, with four toes on each; the gill membranes being like fringed fins, with three boney rays in each. *Syst. Nat. ed. Gmel.* i. 1136. G. 143. sp. 8.

Bipeds in
general.

of swamps and in marshy places, among fallen trees. By an attentive examination of the figure and description given by Mr Ellis, we are completely satisfied that the mud guana is nothing but the larva of some lizard; for it has all the characters of an imperfectly formed animal, joined with several of the characters peculiar to the newt or flat-tailed water lizard. Its length indeed was thirty-one inches, which is larger than any known larva; and this circumstance induced Linnaeus to consider it as a perfectly formed animal. But, we cannot yet pretend to have discovered all the oviparous quadrupeds of America; and the fully formed animal, of which this is the larva, may either conceal itself so carefully in the water as not to be hitherto detected, or it may be a well known lizard, the progress of whose developement has not been hitherto investigated. This larva, or mud guana, had no hind feet; the fore feet had each four toes, with very small claws, like the water lizards of Europe; the jaw-bones
were

were naked, notched, and without teeth * ; the upper and under surfaces of the tail were striped ; each side of the neck was provided with three fringed protuberances, resembling those already described in the flat-tailed water lizard.

Bipeds in general.

Although all the animals hitherto shown or preserved as real bipeds, must be referred either to the oviparous quadrupeds or to serpents, the two following animals have in reality only two feet, and yet seem perfectly developed, so that they cannot be referred to either of these orders.

ART. XXXIV. *THE GROOVED BIPED* †.

THIS animal, which has never been described by any former naturalist, nor even mentioned by travellers, was discovered in Mexico by M. Velasques, who transmitted it for us to M. Polony physician

Grooved Biped.

X 3

* In the *Systema Naturae*, it is said to catch serpents, *validis firmisque dentibus*.—T.

† Le Cannelé.

Grooved
Biped.

cian in St Domingo, from whence it was brought to France by Mad. la Vicomtesse de Fontanges, lady to the commandant of that island, with a degree of care which could hardly have been expected from a beauty, for a reptile that might rather have terrified than pleased her.

This biped is entirely destitute of hind legs; and the most attentive examination could not discover the smallest trace, by which one might suspect they had been removed by accident. It has many circumstances of resemblance to the chalcides already described, having its scales similarly disposed in rings; but it differs from that oviparous quadruped, both in wanting the hind legs, and by having a very short tail, while in that lizard the tail is very long in proportion to the body. The whole body is covered with scales, nearly of a square form, which are disposed in half rings both on the back and belly: The half rings of the two surfaces are so arranged, that the ends of those on the belly regularly abutt against the intervals or lines of separation
between

Grooved
Biped.

between the half rings on the back ; in which circumstance it differs farther from the chalcides, the scales of which are disposed in whole rings entirely surrounding the body. The line where the upper and lower half rings terminate forms a channel or groove along each side of the body, from the head to the anus. On the tail the scales are disposed in complete rings, which entirely surround the body. The edges of all these scales form a great number of longitudinal and transverse grooves or channels, from which, and the deeper groove along each side, the trivial name of the species is derived.

In the specimen which forms the subject of this article, there are one hundred and fifty half rings on the belly, and thirty-one entire rings on the tail, the extremity of which is thick, blunt, and rounded. The whole length of the specimen is eight inches and a half ; its tail measures one inch, and its greatest diameter one-third part of an inch : The head is a quarter of an inch in length, rounded at the muzzle, and hardly

Grooved
Biped.

distinguishable from the body; the upper surface being covered by one large scale, and the muzzle by three scales, larger than those of the half rings, the two outer scales having each a small hole or opening for the nostrils: The lower jaw is edged with scales somewhat larger than those on the half rings: The teeth are very small: The eyes are extremely minute, and have no eyelids: No traces of ears or auditory passages can be discovered. The legs are each a third part of an inch long, being covered with small scales, disposed in rings like those on the body, each foot having four divided toes, with long hooked claws, and on the side of the outer toe there is a protuberance, like the rudiment of a fifth toe. As has been already mentioned, the most scrupulous investigation could not discover the smallest vestige or mark of any hind feet, none of the scales being displaced, nor any cicatrix or indication of any accident or wound. The opening of the anus is transverse, and along its upper edge there are six small tubercles, with pores or openings
at

at their extremities, like those formerly described on the insides of the thighs of the guana, green lizard, gecko, &c.

Grooved
Biped.

The tail of this biped, being as thick at the end as the head of the animal, gives it some general resemblance to the genus of serpents named *Amphisbaena* by Linnaeus, of which the scales are disposed in similar rings: In them likewise the eyes are so small as to be hardly discernible, and no auditory orifices can be distinguished. The grooved biped would certainly fall to be arranged with that genus, were it not for the two feet directly behind the head; and it evidently forms a connecting link between serpents and oviparous quadrupeds, through the genus of *amphisbaena* of the former, and the species *chalcides* of the latter.

Having been sent from America in spirits, it was impossible to ascertain its natural colour; but it seemed to be green, rather lighter on the belly, and darker on the back. The habits of this animal are entirely unknown; but, from its resemblance to the seps and *chalcides*, there is reason to presume

Grooved
Biped.

presume that its habits and manner of life are similar to those two lizards.

ART. XXXV. *THE SHELTOPUSIK.*

Shelto-
pusik.

THE name Sheltopusik is given, by the inhabitants of Russia near the Volga, to the animal which forms the subject of this article, and likewise to a real species of serpent; but as no ambiguity can arise from the use of the name, between two animals so very different in their forms, we have preserved the name as applied by M. Pallas, who first discovered the biped in question*.

It is found in Russia, on the borders of the Volga, in the sandy desert of Naryn, and in the environs of Terequm near the river Kumam, keeping chiefly among long grass in shady vallies, concealing itself among bushes, and flying the approach of mankind. It feeds much on small lizards, particularly the grey or agile species.

The

* Nov. Com. Ac. Scient. Imp. Petrop. xix. 435.

Shelto-
pufik.

The head is large and thicker than the body, having a blunt muzzle, the edges of the mouth being covered by scales somewhat larger than those on the body; the jaws are furnished with a number of small teeth; the nostrils are large; the eyes have each two moveable eyelids; the auditory passages are distinct; the upper part of the head is covered with large scales; the scales on the upper and under surfaces of the body are somewhat scolloped, and are arranged over each other like tiles. On each side of the body there is a longitudinal wrinkle or furrow, at the hinder extremity of which, near the anus, there is a very small foot on each side, covered with four small scales, and having each two small sharp toes. The tail is considerably longer than the body. The whole length of the animal usually exceeds three feet, of which the tail occupies the larger part. The colour is pale yellow, almost uniform over the whole body. Dr Pallas, who examined and dissected the sheltopufik with great
care,

Shelto-
pufik.

care, gives the following principal dimensions :

| | | | Feet. | Inches. | Lines. |
|------------------------------|---|---|-------|---------|-----------------|
| Length, from the muzzle to | | | | | |
| the anus | - | - | 1 | 6 | 0 |
| Length of the tail | - | | 2 | 4 | 0 |
| Length of the head | - | | 0 | 1 | 8 $\frac{1}{2}$ |
| Circumference of the head | | | | | |
| at its base | - | - | 0 | 3 | 10 |
| Circumference of the body | | | | | |
| before the anus | - | | 0 | 3 | 5 |
| Circumference of the tail at | | | | | |
| its origin | - | - | 0 | 3 | 2 |
| Length of each foot | - | | 0 | 0 | 1 $\frac{2}{3}$ |

ALPHA-

ALPHABETICAL TABLE

*Of all the Names and Synonimes employea
in the Natural History of Oviparous Qua-
drupeds and Bipeds.*

| | | | | |
|---------------|--------|----------------|-----------------------|--------------|
| A | | | Basiliscus americanus | ib |
| Αχαιοι | - | ii. 114 | Basilisk | - ib |
| Agama | - | i. 366 | Βατραχος | - ii. 226 |
| Agame | - | ib | ελειος | - ii. 197 |
| Agua | - | ii. 317 | Bimaculé | - i. 328 |
| Alebrenne | - | ii. 138 | Binjawcok | - i. 358 |
| Aligator | - | i. 234. 293 | Biped, grooved | ii. 325 |
| Algire | - | ii. 36 | Bipeds | - ii. 321 |
| Ameira | - | i. 411 | Blânde | - ii. 138 |
| Ameiva | - | i. 410 | Bombée | - i. 208 |
| Americima | - | ii. 29 | Bordée | - ii. 237 |
| Anoles | - | i. 415 | Boffu | - ii. 310 |
| Anolis | - | i. 399. ii. 66 | Boffue | - ii. 264 |
| de terre | - | i. 404 | Bouiah | - ii. 1 |
| Arraffade | - | ii. 138 | Brochet-de-terre | ii. 54 |
| Ask | - | ii. 162 | Brun | - ii. 301 |
| Ασκαλαβωτης | - | i. 363 | Brune | - ii. 265 |
| Axolotl | - | ii. 183 | Bufo | - ii. 272 |
| Azure | - | ii. 29 | aquat. furin. | ii. 311 |
| B | | | Calamita | ii. 273. 304 |
| Bande-blanche | i. 212 | | cornutus | - ii. 316 |
| Basilic | - | i. 354 | fuscus | - ii. 301 |
| | | | igneus | - ii. 306 |
| | | | Bufo | |

334 ALPHABETICAL TABLE.

| | | | |
|------------------|--------------|----------------------|-------------|
| Bufo maj. furin. | ii. 311 | Chamaeleo bonae-spei | ii. 2 |
| marmoratus | ii. 318 | zeilanicus | ib |
| obstetricans | ii. 273 | χαμαίλεων | - ii. 1 |
| pustulosus | ii. 309 | Chamaeleo parisiens. | ii. 2 |
| rubetarum | ii. 273 | Chameleon | - ii. 1 |
| schreberianus | ii. 298 | , arabian | ii. 26 |
| spinosus virgin. | ii. 316 | , cape | - ii. 27 |
| terrestris | ii. 273 | , ceylon | ii. 26 |
| min. | - ib | , egyptian | ib |
| ventricosus | ii. 310 | , large grey | ii. 2 |
| viridis | ii. 273. 296 | , mexican | ii. 26 |
| Bombos | - i. 275 | terrestris | ii. 2 |
| C | | Champsan | - i. 235 |
| Caecilia major | ii. 121 | Chagrinée | - i. 216 |
| Calamite | - ii. 304 | χαλωγη | - i. 181 |
| Caliscertula | i. 399 | χερσαίω | - ib |
| Cameleon | - ii. 1 | χερσος | - i. 385 |
| Cannelé | ii. 325 | Cicigna | - ii. 108 |
| Canuaneros | - i. 129 | Cordyle | - i. 406 |
| Caouana | - i. 128 | Cordylus | i. 305. 406 |
| Caouane | - i. 129 | brasiliensis | ii. 30. 81 |
| Caret | - ib | hispidus | ii. 59 |
| Caudiverbera | i. 301 | orbicularis | ib |
| Cayman | - i. 235 | Stellio | - ii. 38 |
| Chalcides | ii. 119 | Cornu | - ii. 316 |
| tridactyla | ii. 121 | Cosfordilos | - ii. 38 |
| χαλκίς | ii. 123 | Couleur-de-feu | ii. 306 |
| Chamaeleo | - ii. 1 | Couleur-de-lait | ii. 266 |
| africanus | ii. 2 | Courte-queue | i. 214 |
| | | Cracheur | - ii. 77 |
| | | Crapaud | |

ALPHABETICAL TABLE. 335

| | | | |
|-----------------|---------|----------|-----------------|
| Crapaud commune | ii. 272 | Dragon | i. 305. ii. 125 |
| Criard - | ii. 319 | Dragonne | i. 305 |
| Crocodile - | i. 228 | | |

à machoires

E

| | | | |
|--------------|--------|--------------|-----------|
| alongées | i. 296 | Ηλυσ | - ii. 114 |
| , american | i. 293 | Epaule-armée | ii. 240 |
| , black | i. 294 | Exagonal - | i. 409 |
| , long-nosed | i. 296 | | |
| , nilotic | i. 234 | | |

F

| | | | |
|--------------|---------|---------------|---------|
| propre - | ib | Famocantrata | ii. 104 |
| Crocodilus - | i. 235 | Famocantraton | ib |
| africanus | i. 236 | Fardacho - | i. 385 |
| americanus | ib | Feuer-kroete | ii. 307 |
| Cayman | i. 235 | Fluteuse - | ii. 267 |
| niloticus - | ib | Fly-catcher - | i. 396 |
| terrestris | i. 236 | Fouette-queue | i. 301 |
| Cururu - | ii. 311 | Frog, bull - | ii. 242 |

D

| | | | |
|---------------------|---------|-----------------|---------|
| Dentelée - | i. 207 | , common | ii. 226 |
| Diafik - | i. 235 | , duck-footed | ii. 239 |
| Doocame - | i. 156 | , edged - | ii. 237 |
| Doogame - | ib | , edible - | ii. 197 |
| Doré - | ii. 53 | , five-toed | ii. 245 |
| Dofen-schild-kroete | i. 209 | , land - | ii. 231 |
| Draco americana | i. 354 | , laced - | ii. 249 |
| major - | ii. 126 | , pearly | ii. 246 |
| praeapos | ii. 136 | , ringing | ii. 235 |
| volans | ii. 126 | , scaly - | ii. 250 |
| Draçunculus - | ib | , sea - | ii. 241 |
| | | , shoulder-knot | ii. 240 |
| | | , silent - | ii. 228 |

Frog,

336 ALPHABETICAL TABLE.

| | | | | |
|--------------------|-----------------|-----------------|---------|---------|
| Frog, two-coloured | ii. 263 | Guano | - | i. 316 |
| , veined | ii. 238 | Guaral | - | ii. 65 |
| , virginian | ii. 250 | | | |
| FROGS | - | | H | |
| | | Hecate | i. 166. | 200 |
| | G | Helioscope | - | ii. 34 |
| Galeote | - | Hexagone | - | i. 409 |
| Galiote | - | Hyla aurantiaca | ii. 268 | |
| Galley-wasp | ii. 54 | fusca | - | ii. 265 |
| Galonée | i. 419. ii. 249 | lactea | - | ii. 266 |
| Galtabé | - | ranaeformis | ii. 264 | |
| Gavial | - | rubra | - | ii. 269 |
| Gecko | - | skeleton | - | ib |
| aculeatus | ii. 93 | tibiatrix | ii. 267 | |
| muricatus | ii. 92 | viridis | - | ii. 255 |
| perlatus | - | | I | |
| teres | - | | | |
| verticillatus | ii. 93 | Jacane | - | i. 235 |
| Geckotte | - | Jackie | - | ii. 247 |
| Geometrique | i. 200 | Jaune | - | i. 171 |
| Gobe-mouche | i. 396 | Igharucu | - | i. 315 |
| Gods-fish | - | Iguana | - | i. 332 |
| Goitreux | ii. 71. 309 | Calotes | i. 363 | |
| Grecque | - | chalcidica | ib | |
| Grenouille comm. | ii. 197 | clamosa | - | i. 326 |
| mangeable | ib | cordylina | i. 366 | |
| taureau | ii. 242 | delicatissima | i. 332 | |
| Grifon | - | falamandrina | i. 366 | |
| Ground-lizard | i. 411 | sepiformis | ii. 32 | |
| Guana | - | Iguane | - | i. 332 |
| | | | | Inguete |

ALPHABETICAL TABLE. 337

| | | | |
|-----------------|----------|------------------|--------------|
| Inguete de agua | ii. 183 | Lacerta aquatica | ii. 162. 179 |
| Jogame | - i. 181 | aurata | - ii. 53 |
| Ifikame | - ib | azurea | - ii. 29 |
| Juruca | - i. 129 | barbara | ii. 53 |
| Jurucua | - i. 79 | Basiliscus | i. 354 |
| Jurucuja | - ib | bicarinata | i. 330 |

K

| | | | |
|---------------|----------|--------------|-------------|
| Καλαβωτης | - i. 363 | Calotes | i. 363 |
| Kalot | - ib | cauda ancip. | ii. 248 |
| Καλωτης | - ib | caereul. | ii. 28 |
| Kaouane | - i. 129 | cadiverbera | i. 301. 305 |
| Kimbuta | - i. 235 | Chalcides | ii. 119 |
| Kimfak | - ib | chalcidica | ii. 121 |
| Kobberaguion | i. 304 | Chamaeleo | ii. 2 |
| Krauthun | - i. 385 | Cordylus | i. 404 |
| Kreutz-kroete | ii. 304 | Crocodylus | i. 235 |
| Κροκοδειλος | - i. 235 | cruenta | ii. 37 |

L

| | | | |
|---------------------|----------|---------------|---------|
| Lacerta abdominalis | ii. 118 | Dracaena | i. 305 |
| africana volans | ii. 126 | fasciata | ii. 28 |
| Agama | - i. 366 | gangetica | i. 296 |
| agilis | - i. 374 | Gecko | ii. 84 |
| Algira | - ii. 36 | helioscopus | ii. 34 |
| amboinensis | i. 357 | japonica | ii. 160 |
| Ameiva | - i. 410 | Iguana | i. 332 |
| americana | ii. 185 | interpunctata | ii. 76 |
| anguina | ii. 113 | lacustris | ii. 180 |
| angulata | i. 409 | lateralis | ii. 52 |
| | | Leguan | i. 333 |
| | | lemniscata | i. 419 |

338 ALPHABETICAL TABLE.

| | | | |
|-------------------|---------|---------------------|------------|
| Lacerta marmorata | ii. 63 | Lacerta indica | ii. 126 |
| mauritanica | ii. 92 | vulgaris | ii. 178 |
| monitor | i. 316 | Lacertus aquaticus | ii. 162 |
| nilotica - | ii. 75 | cinereus min. | ii. 66 |
| orbicularis | ii. 59 | cyprius | ii. 42 |
| palustris | ii. 162 | indicus i. 305. 411 | |
| plica - | ii. 32 | maj. viridis i. 411 | |
| principalis | i. 327 | ciner. | ib |
| punctata | ii. 185 | marianus min. | ii. 28 |
| quadrilineata | ii. 186 | maximus | i. 235 |
| quinque-lineata | ii. 62 | orbicularis | ii. 60 |
| Salamandra | ii. 139 | orbiculatus | ib |
| scutata | i. 326 | scincoides | ii. 42. 53 |
| Seps - | ii. 108 | Senembi | i. 333 |
| fexlineata | i. 417 | viridis i. 351. 385 | |
| Sputator | ii. 77 | carolinensis | i. 395 |
| Stellio - | ii. 38 | volans | ii. 126 |
| Stincus - | ii. 42 | vulgaris | i. 371 |
| strumosa | ii. 71 | Lagartija - | i. 370 |
| superciliofa | i. 323 | Lagarto - | i. 385 |
| Teguixin | ii. 73 | Lagartor - | i. 235 |
| terrestris | i. 370 | Land-pike - | ii. 54 |
| Tiliguerta | i. 400 | Langrola - | i. 370 |
| Tiligugu | ii. 47 | Large-doigt | i. 327 |
| turcica - | ii. 31 | Laverne - | ii. 138 |
| velox - | i. 383 | Leguana - | i. 333 |
| viridis - | i. 385 | Leviathan - - | i. 235 |
| jamaicensis | ii. 70 | Lezard commune | i. 370 |
| Umbra | ii. 31 | cornu | i. 352 |
| volans - | ii. 126 | , grand | i. 333 |
| | | Lezard | |

ALPHABETICAL TABLE. 339

| | | | |
|------------------|---------|----------------|---------|
| Lezard gris | i. 370 | Lizard, lion | i. 417 |
| gros - | i. 333 | , nilotic - | ii. 75 |
| moucheté | i. 315 | , nimble | i. 370 |
| ordinaire | ii. 370 | , plaited | ii. 32 |
| vert - | i. 383 | , punctuated | ii. 185 |
| Ligan - | i. 316 | , red-headed | i. 404 |
| Ligans - | ib | , red-throated | ii. 69 |
| Lion - | i. 417 | , spherical | ii. 60 |
| Lizard, algerine | ii. 36 | , spitting | ii. 77 |
| , amboina | i. 357 | , starry - | ii. 38 |
| , Argus | i. 414 | , St Domingo | ii. 95 |
| , azure - | ii. 29 | , striped | ii. 62 |
| , bloody | ii. 37 | , strumous | ii. 71 |
| , blue - | i. 367 | , supercilious | i. 323 |
| , blue-tailed | ii. 28 | , thick-toed | i. 327 |
| , cinereous | i. 367 | , three-toed | ii. 189 |
| , green | ib | , two-ridged | i. 330 |
| , crested | i. 358 | , two-spot | i. 328 |
| , deaf - - | ii. 104 | , warty | ii. 162 |
| , dotted | ii. 76 | Lizard-cayman | i. 311 |
| , flat-headed | ii. 98 | LIZARDS - | i. 228 |
| , flying - | ii. 125 | Loggerhead | i. 128 |
| , fork-headed | i. 325 | Luth - | i. 146 |
| , four-lined | ii. 186 | Lyra - | ib |
| , garden | ii. 66 | | |
| , gilded - | ii. 53 | | |
| , green - | i. 385 | | |
| , horned | i. 352 | | |
| , japanese | ii. 160 | | |
| , laced - | i. 419 | | |

M

| | |
|-------------|-------------|
| Mabouya | ii. 47. 54 |
| Marasandola | ii. 162 |
| Marbré | ii. 63. 318 |
| Meer-frosch | ii. 240 |

340 ALPHABETICAL TABLE.

| | | | | | |
|--------------|----|---------|-----------------|-----|---------|
| Mirtil | - | ii. 138 | Pluvine | - | ii. 138 |
| Molle | . | i. 173 | Ponctué | - | ii. 185 |
| Mouron | - | ii. 138 | Porte-crete | - | i. 357 |
| Mud Guana | - | ii. 323 | Proteus marinus | ii. | 248 |
| Muette | - | ii. 226 | Punter-maal | - | ii. 138 |
| Mugiffante | - | ii. 242 | Pustuleux | - | ii. 309 |
| Murena Syren | - | ii. 323 | | | |
| Mus-aquatis | i. | 79 156 | | | |

Q

| | | | | | |
|----------|---|---------|--------------|-----|-----|
| Mufician | - | ii. 320 | Quatre-raies | ii. | 186 |
| | | | Quatzpaleo | ii. | 81 |
| | | | Queue-bleue | ii. | 28 |

N

| | | |
|-------------------|----|---------|
| Natter-jack | - | ii. 233 |
| Νειλονεροκοδινγος | i. | 235 |

| | | |
|----------|---|--------|
| Noiratre | - | i. 219 |
|----------|---|--------|

O

| | | |
|------------------|----|--------|
| Occiput-fourchue | i. | 325 |
| Οφιουαχης | - | i. 363 |
| Oulla-ouna | - | i. 396 |

P

| | | |
|-------------|---|---------|
| Pada | - | ii. 273 |
| Patte-d'oie | - | ii. 239 |
| Perlée | - | ii. 246 |
| Περώνος | - | ii. 273 |
| Phrynum | - | ib. |
| Piloris | - | i. 404 |
| Pipa | - | ii. 311 |
| americana | - | ib. |
| Pistillione | - | ii. 38 |
| Pliffé | - | ii. 32 |
| Pluviale | - | ii. 233 |

R

| | | |
|------------------|----------|---------|
| Raboteuse | - | i. 205 |
| Rana | - | ii. 198 |
| aquatica | ii. | 226 |
| innoxia | ib. | |
| arborea | - | ii. 253 |
| max. | - | ii. 265 |
| bicolor | - | ii. 263 |
| boans | - | ii. 266 |
| bombina | ii. | 306 |
| Bufo | - | ii. 272 |
| brasiliensis | ii. | 317 |
| gracilis | ii. | 269 |
| campanifona | ii. | 236 |
| cornuta | - | ii. 316 |
| esculenta | ii. | 197 |
| fusca terrestris | ii. | 226 |
| gibbosa | ii. 198. | 310 |

Rana

ALPHABETICAL TABLE. 341

| | | | | | |
|--------------------|----------|---------|----------------------|----------|---------|
| Rana gigas | - | ii. 226 | Rat-de-mer | - | i. 146 |
| margaritifera | | ii. 246 | Rayé | - | ii. 186 |
| marginata | | ii. 237 | Rayon-vert | | ii. 298 |
| maxima | | ii. 239 | Reticulaire | - | ii. 238 |
| musica | - | ii. 319 | Roehrling | - | ii. 304 |
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